



SAUDI ARABIA

SELECTED ISSUES

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SAUDI ARABIA

SELECTED ISSUES

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ASSESSING THE IMPORTANCE OF OIL AND INTEREST RATE SPILLOVERS FOR SAUDI ARABIA¹

Oil prices have fallen by over 40 percent since mid-2014 while the Fed is expected in the coming months to begin raising its policy rate at the beginning of a gradual tightening cycle. Given the importance of oil to the economy and the peg of the riyal to the U.S. dollar, these are two key developments for Saudi Arabia. This paper assesses the importance of these shocks to the economy and banking system through a number of methodologies. The main takeaway is that oil prices have typically played a bigger role than interest rates in affecting economic and financial outcomes in Saudi Arabia. While a temporary drop in oil prices would likely have little effect on the economy and banks given the financial cushions that have been built-up, a longer-lasting period of low oil prices would have a more significant impact.

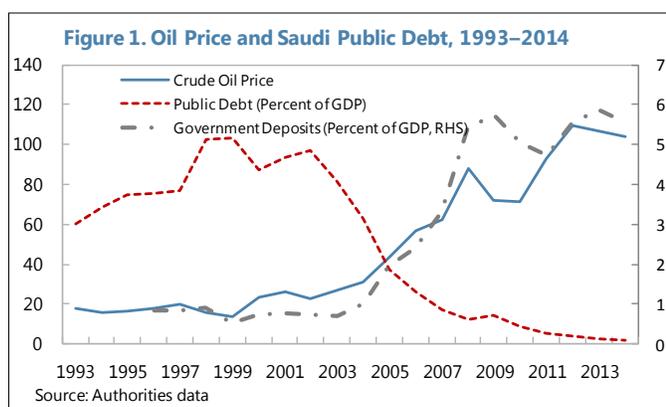
1. Two key features of the Saudi Arabian economy are its dependence on oil and the pegged exchange rate to the U.S. dollar.

- **Oil revenues** account for around 90 percent of central government fiscal revenues and around 85 percent of export revenues, while the oil sector comprises over 40 percent of overall GDP. Further, activity in the non-oil sector is correlated with oil prices through government spending. The importance of oil revenues to the economy has changed little over the past decade (Table 1). Dealing with oil price volatility and uncertainty is a key challenge facing Saudi Arabia and it is important that strong fiscal buffers are built-up in periods of high oil prices to help cushion government spending when oil prices are low. Saudi Arabia has reduced government debt to very low levels and the government had deposits in the banking system equivalent to 56 percent of GDP at end-2014 (Figure 1).

Table 1. Saudi Arabia: Dependence on Oil, 2005–15
(percent share)

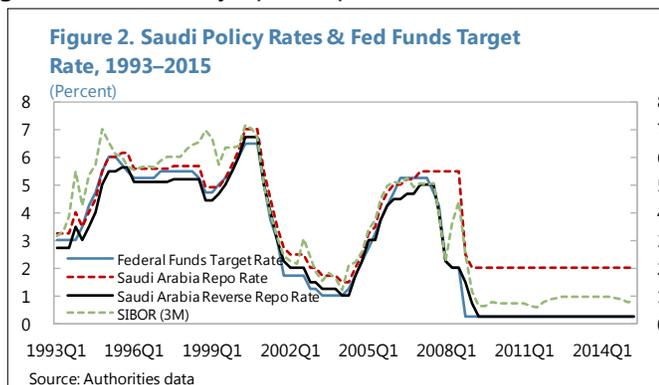
	2005–07	2010–14	2015 proj.
Oil GDP/GDP	50.0	46.0	30.4
Oil Exports/GDP	49.5	42.5	28.5
Oil Exports/Exports G&S	83.3	82.6	73.8
Oil Revenue/Revenue	88.5	89.6	81.0

Sources: Country authorities and IMF staff estimates.



¹ Prepared by Goblan Algahtani, Nayef Alsadoum (both SAMA), Tim Callen (MCD), Ken Miyajima (MCM), Dirk Muir (RES), and Ben Piven (MCD).

- Exchange rate regime.** Saudi Arabia has pegged the riyal to the U.S. dollar at a parity of 3.75 since 1986. Given the fixed exchange regime and relatively open capital account, SAMA moves its policy rates closely with the fed funds rate to prevent pressures developing on either side of the riyal peg (Figure 2). The expected increase in U.S. interest rates in the coming years will therefore see SAMA also raise its policy rate and this will feed into other interest rates, although the current high liquidity levels in the bank system may slow the rate of pass-through. The strength of the dollar over the past year has also led to nominal and real effective appreciations of the riyal which is now at its highest level in real terms since 2003 despite the large terms of trade decline in the face of the drop in oil prices.



2. With oil prices having fallen over the past year and U.S. policy interest rates expected to move higher in the period ahead, Saudi Arabia is facing two important shocks that will have an impact on the economic outlook. Empirical studies find that the impact of oil prices depends on the importance of oil revenues for the economy and the way oil revenues filter through to the real economy. The size of the government and its fiscal policy, for instance, plays a primary role in determining how oil prices impact the economy (Husain, Tazhibayeva, and Ter-Martirosyan (2008)). In a recent study on Saudi Arabia, Alghaith et al (2014) found a positive and strong impact of oil prices on the economy through government spending. Similarly, for the Kuwaiti economy, Eltony and Al-Awadi (2001) found that oil price shocks were mainly transmitted through government expenditure. Other studies have focused on the effects of oil prices on stock markets and find a positive association in oil exporting countries.²

3. Interest rate changes, on the other hand, have a less significant impact on economic outcomes. Sheehan and Russer (1995), for instance, find that the monetary policy channel in Saudi Arabia has a limited impact on the economy because tighter policy is usually associated with periods of strong growth driven by higher oil revenues. Alghaith et al (2014) find that an increase in the U.S. federal funds rate has a small and statistically insignificant impact on Saudi Arabia's non-oil output, although a significant negative impact on inflation. They argue that higher U.S. interest rates are unlikely to have an adverse impact on the Saudi economy, especially if the increase in the fed funds rate is driven by an improving U.S. economy.

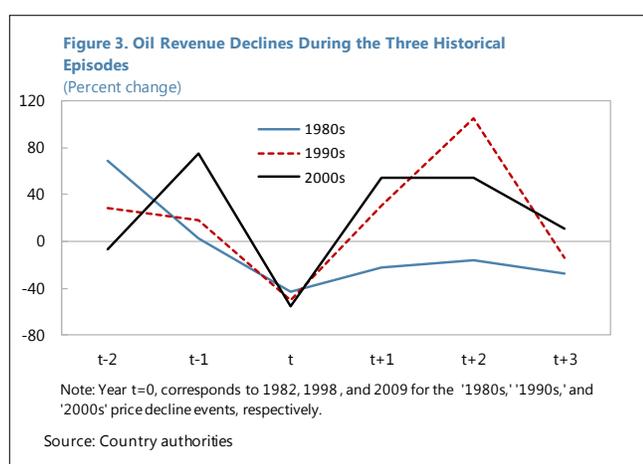
² For example, see Park and Ratti (2008), Bjørnland (2009) who test for the impact on Norway's stock market. Wang et al. (2013) show that the oil market has a significant impact on the stock market and that the contribution of oil prices shocks on the stock market is stronger in oil exporting countries.

A. What Does History Tell us About the Impact of Oil Price Declines and Interest Rate Increases on the Saudi Economy?

4. **The event analysis presented below identifies past periods when oil prices have dropped significantly or U.S. interest rates have risen and looks at the behavior of key economic and financial variables during these periods.** Such analysis can be useful in identifying the key transmission channels and effects, but has drawbacks in that it is difficult to isolate specific events as in any dynamic economy there are many factors changing at the same time. In earlier periods, the analysis is also hampered by a lack of data.

Episodes of large declines in oil revenue

5. **Three periods are identified where oil revenues fell by 50 percent peak-to-trough either because oil prices fell, oil output fell, or a combination of both.** These are 1982–86, 1998–99, and 2008–09 (Figure 3). The drop in revenues in the first half of the 1980s proved long lasting, driven in large part by expanding oil production and increased efforts in many advanced countries to improve energy efficiency. Nominal oil revenues only returned to their 1982 level in 2004. The other two events were short-lived and principally reflected a contraction in global oil demand during a sharp slowing in global economic activity (the Asian financial crisis in 1998–99 and the global financial crisis in 2008–09). While there may have been other transmission channels at work during these periods, given the structure of the Saudi economy the oil channel is likely to dominate.



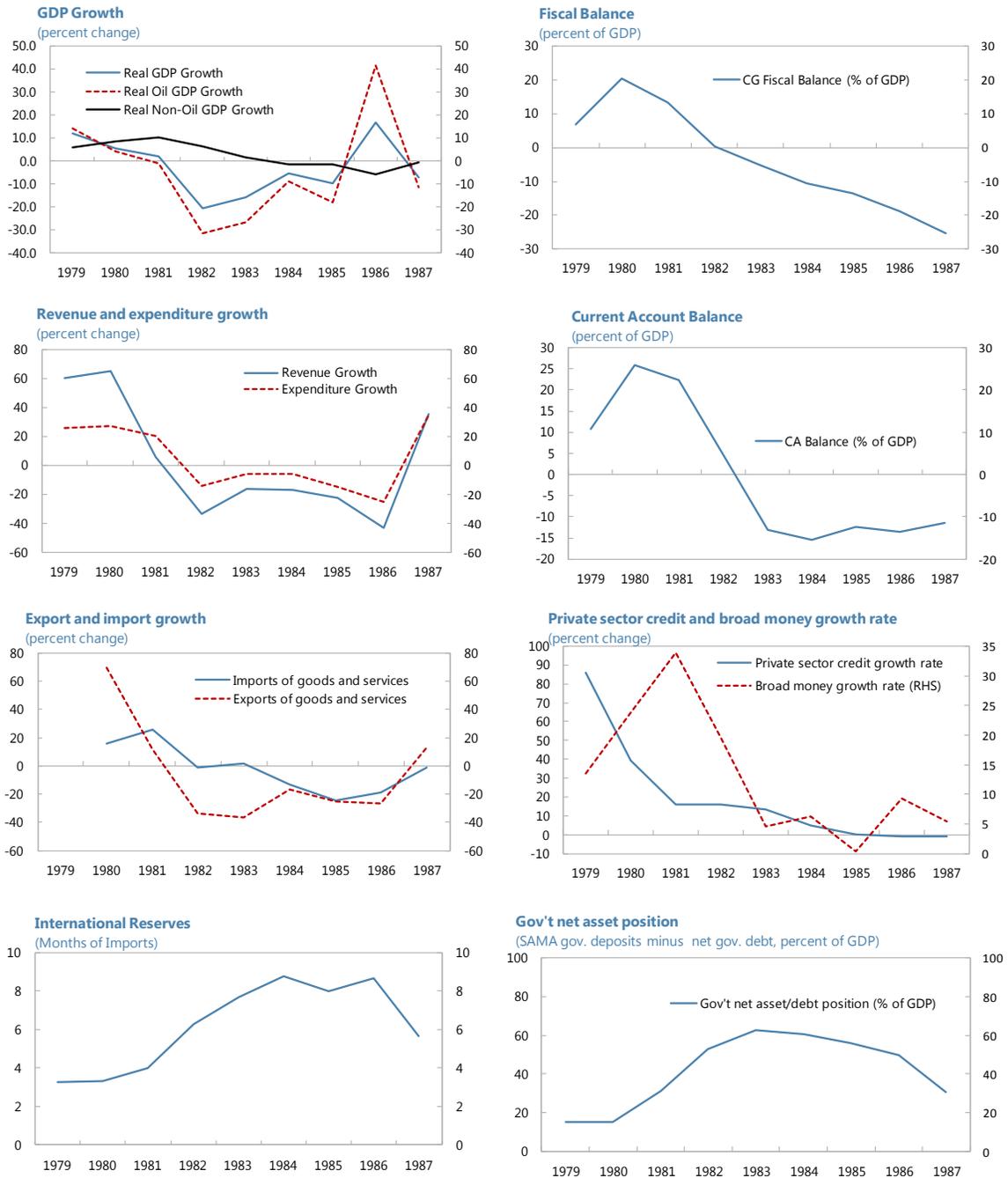
6. **In all three episodes, macroeconomic variables behaved similarly.** As oil revenues declined, money and credit growth slowed, export receipts and government revenues fell, and despite a decline in imports and government spending, the fiscal and external balances moved into deficit (or the surplus narrowed considerably). Real GDP declined, driven by a substantial drop in real oil GDP as Saudi Arabia responded to the weakness in global oil markets by cutting production. While slowing, real non-oil GDP growth generally proved more resilient. While data is not available for all three episodes (and hence is not shown), equity prices declined and, with a lag, non-performing loans in the banking sector rose during the latter two periods.³

³ The bankruptcy of two large non-listed conglomerates in 2009 contributed to the increase in NPLs in the 2008–09 period.

7. Nevertheless, differences can be seen across the three episodes that emphasize the importance of the duration of the oil shock and the starting position (Figures 4–6).

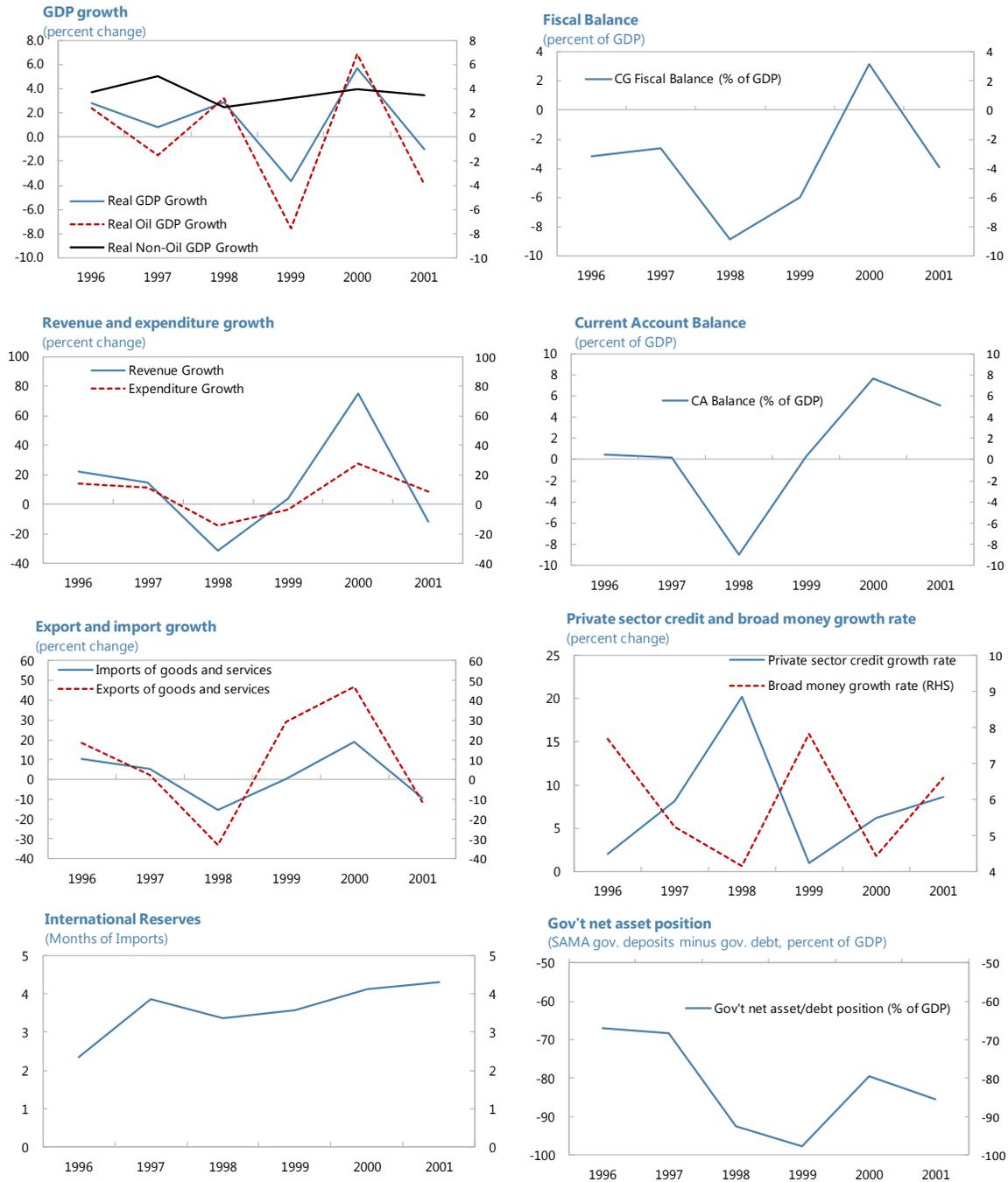
- **1982–86:** As excess supply developed in the global oil market in the early 1980s, Saudi Arabia began to reduce production, which declined from 10.4 mb/d in 1981 to 3.5 mb/d in 1983. Oil prices also declined over this period, and then dropped very sharply in 1986 as Saudi Arabia increased its production levels. This resulted in a substantial drop in oil revenues and the fiscal and external balances moved into deficit even as the government cut back on spending and imports fell. Credit and broad money growth slowed sharply. Real GDP was severely affected, dropping by a cumulative 25 percent from 1981–85. Initially this was driven by a sharp fall in oil GDP, but non-oil GDP also declined. Ahead of the decline in oil revenues, the government started from a strong fiscal position with a large surplus in 1980–81 and net financial assets that are tentatively estimated to have been around 60 percent of GDP. Nevertheless, and despite sharp government expenditure reductions, these assets were run down by the early 1990s.
- **1998–99:** The Asian financial crisis led to a sharp reduction in the global demand for oil and a large drop in oil prices. Saudi Arabia, together with other OPEC members, reduced production in response (in late 1998 and early 1999). Oil revenues fell substantially in 1998, pushing the current account and fiscal balance into, or further into, deficit. Broad money growth slowed in 1998, and credit growth the year after. Government spending was reduced, and non-oil GDP growth slowed. However, overall GDP growth accelerated slightly in 1998 given increased oil production that year, before turning negative in 1999 as oil production was cut. The starting fiscal position was weak—a deficit of around 3 percent of GDP and outstanding debt of around 70 percent of GDP. This left the government with little option but to reduce spending in the face of the drop in oil revenues.
- **2008–09:** With the onset of the global financial crisis, oil prices dropped sharply and Saudi Arabia, together with OPEC partners, cut production. Export and fiscal revenues dropped sharply in 2009, but government spending growth continued and the decline in imports was more limited than in earlier episodes. The fiscal and external balances declined substantially and credit and money growth slowed. Real GDP declined in 2009 driven by lower oil production, but while slowing from high levels, non-oil GDP growth remained around 5 percent. The starting fiscal position, with a surplus of close to 30 percent of GDP and government net financial assets of around 45 percent of GDP, provided a platform where the government did not need to procyclically reduce its spending in response to the drop in oil revenues.

Figure 4. Economic and Financial Developments Around the 1982–86 Decline in Oil Prices



Source: IMF staff calculations; Haver

Figure 5. Economic and Financial Developments Around the 1998–99 Decline in Oil Prices



Source: IMF staff calculations; Haver

Figure 6. Economic and Financial Developments Around the 2008–09 Decline in Oil Prices

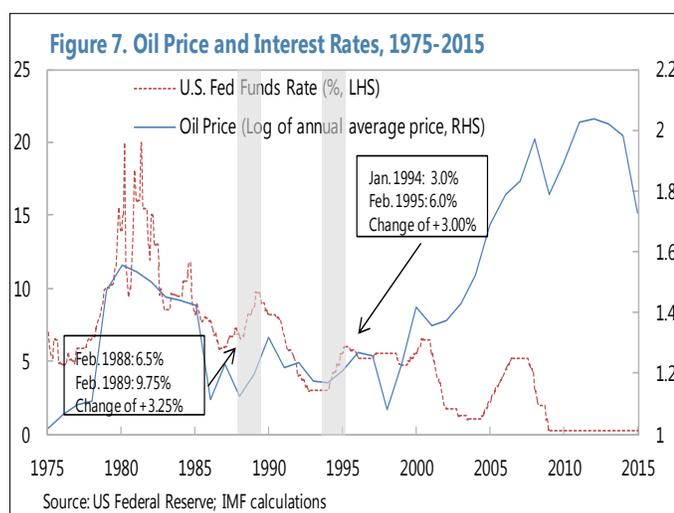


Source: IMF staff calculations; Haver

8. These episodes emphasize the common channels of transmission of the decline in oil revenues to the Saudi economy, but also highlight important differences. The starting fiscal position is clearly one important determinant of the macroeconomic and financial impact. The government was able to cushion the impact of falling oil prices on non-oil activity by drawing on buffers to maintain expenditure in 2008, but from a weaker starting position in 1998, the government cut back expenditure which hurt non-oil growth. Another is the persistence of the oil price decline—if it is long-lasting, the impact on the economy is greater and even strong initial buffers can be used up quickly.

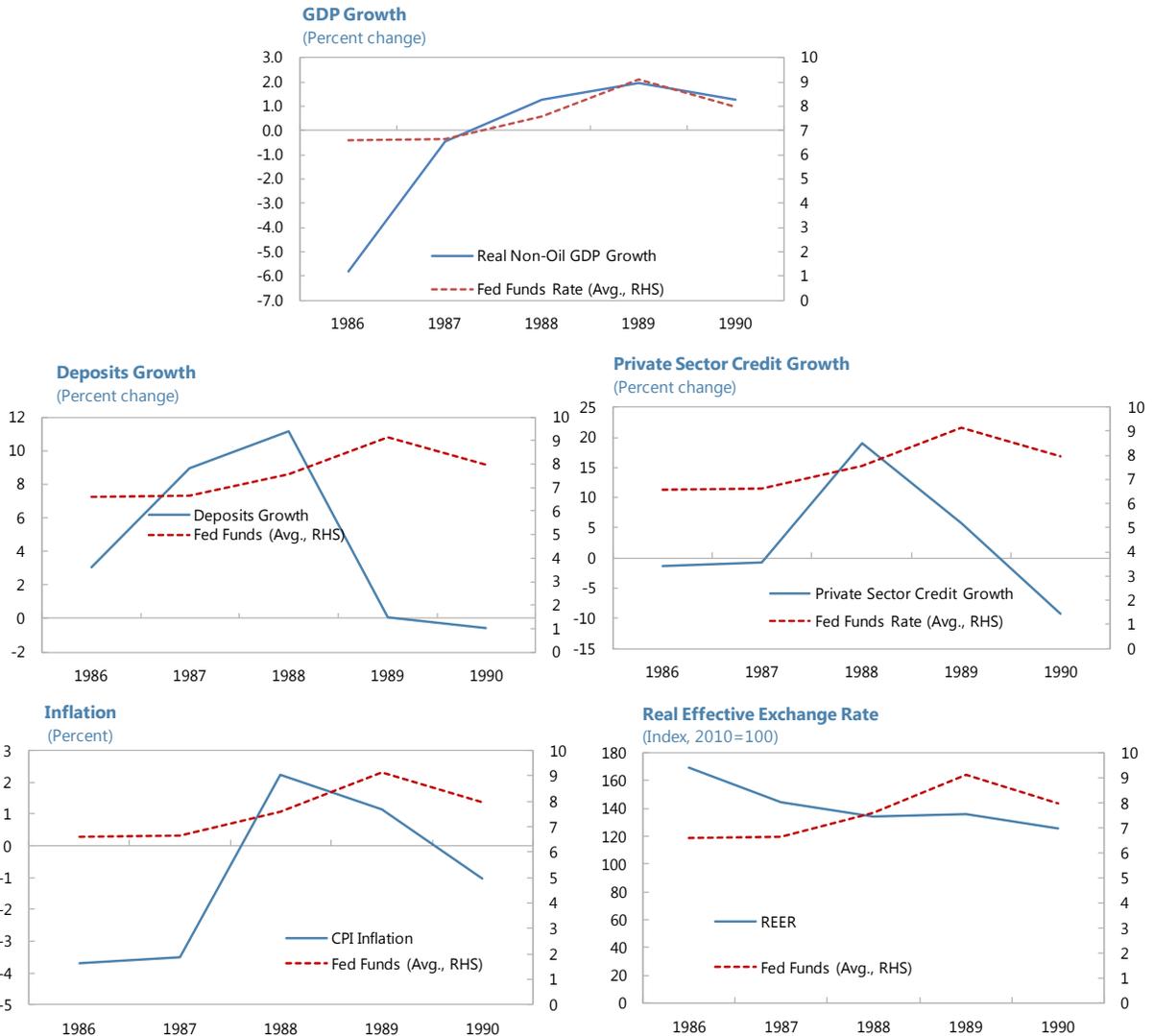
Episodes of increasing U.S. interest rates

9. Periods of rising U.S. interest rates have often occurred at the same time as increasing oil prices (Figure 7). These periods are not particularly useful in shedding light on the possible consequences of higher interest rates at the current juncture. Rather, the analysis identifies two periods when the Fed was tightening policy and oil prices remained broadly flat. In the first episode, U.S. interest rates increased from 6.5 percent in February 1988 to 9.75 percent in February 1989, while oil prices were more or less unchanged. In the second episode, interest rates rose from 3 percent in January 1994 to 6 percent in February 1995.



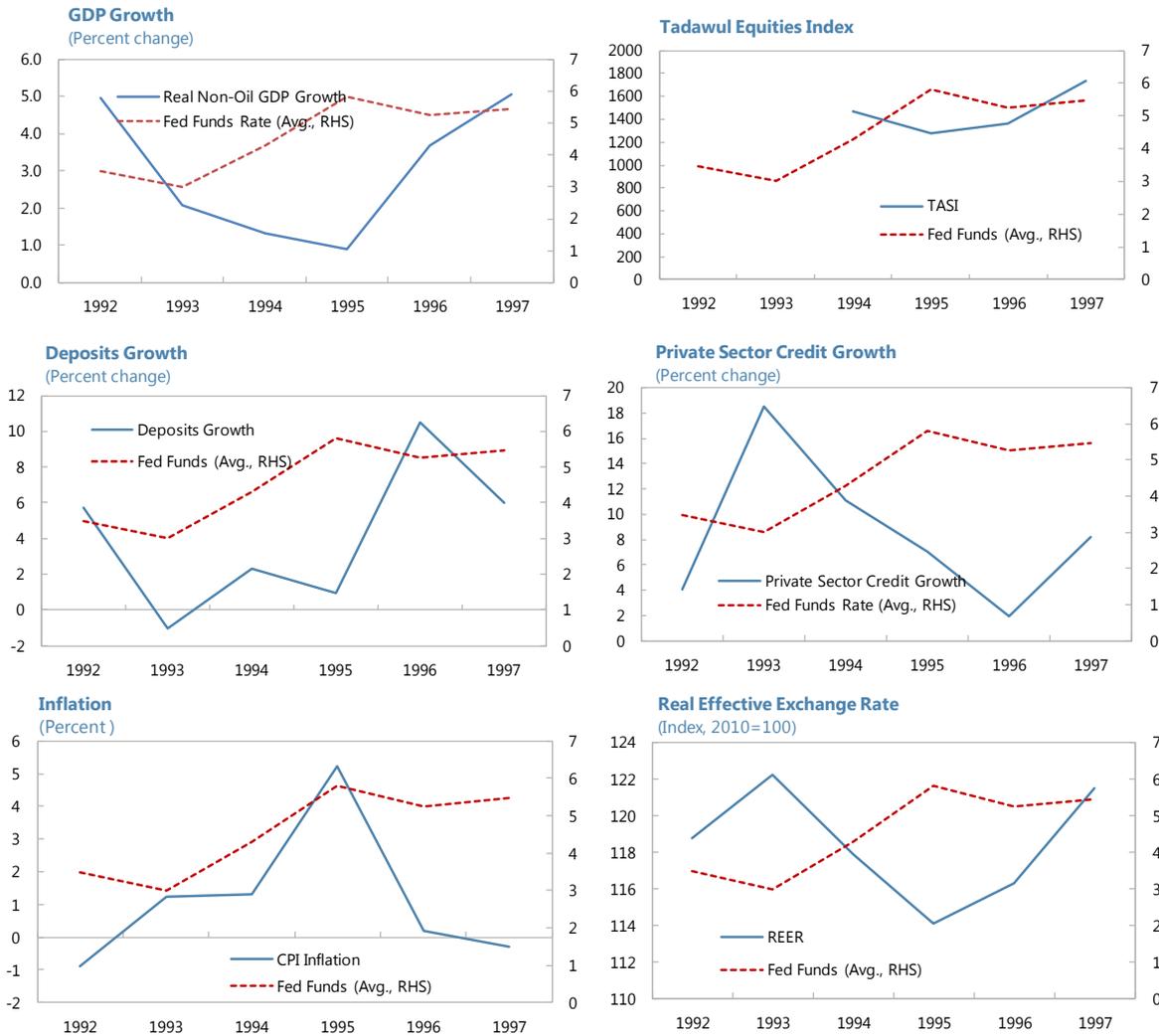
10. These two episodes of rising U.S. interest rates do not yield clear conclusions on the impact on the Saudi economy (Figures 8-9). While higher interest rates do appear to be associated with a slowing in deposit and credit growth, the behavior of non-oil GDP is different across the two episodes. Further, the impact on inflation is not clear cut.

Figure 8. Economic and Financial Developments Around the 1988–89 Tightening of U.S. Monetary Policy



Source: IMF staff calculations; Haver

Figure 9. Economic and Financial Developments Around the 1994–95 Tightening of U.S. Monetary Policy



Source: IMF staff calculations; Haver

B. Econometric Analysis of the Oil and Interest Rate Links in the Saudi Economy

11. In this section, two VARs are used to assess the impact of lower oil prices and higher interest rates on the Saudi economy and banking system. First, the macro-financial links are investigated using a quarterly VAR. Second, an annual panel VAR is run to look at the determinants of credit quality and deposits in the banking system.

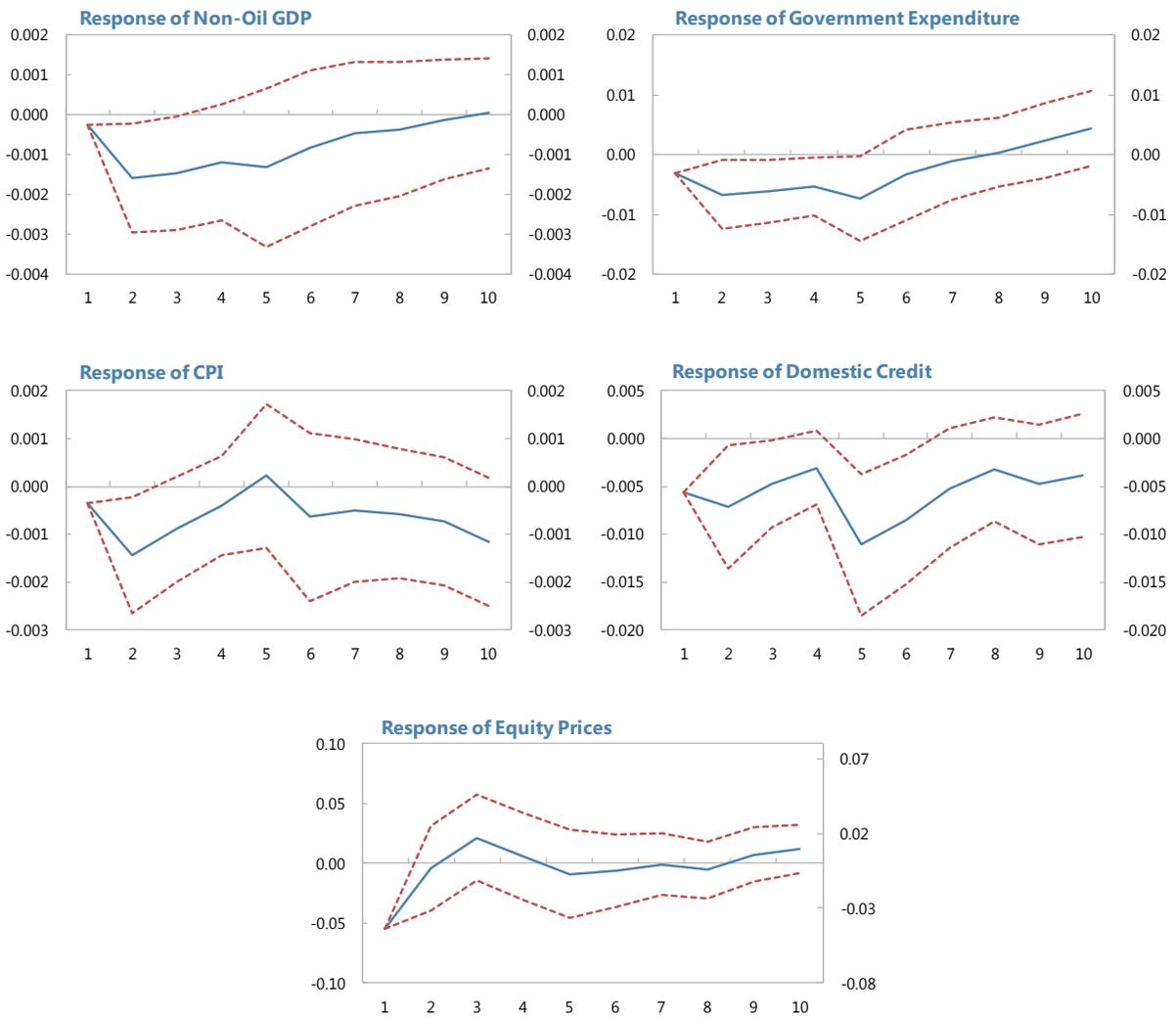
Macro-financial links—A VAR analysis

12. A quarterly VAR was estimated to look at the impact of oil prices and interest rates on the Saudi economy. Two global variables—the real oil price and the U.S. Fed Funds rate—and a number of Saudi Arabian economic and financial variables are considered in the model. These variables are: real equity prices, real private sector credit, real government spending (all deflated by the CPI), CPI inflation, and real non-oil GDP. The models are estimated on quarterly data from 1995Q1 to 2014Q4, with annual series for real non-oil GDP and real government spending interpolated using a quadratic trend given a full quarterly time series is unavailable for either variable.

13. The main results from the models are as follows:

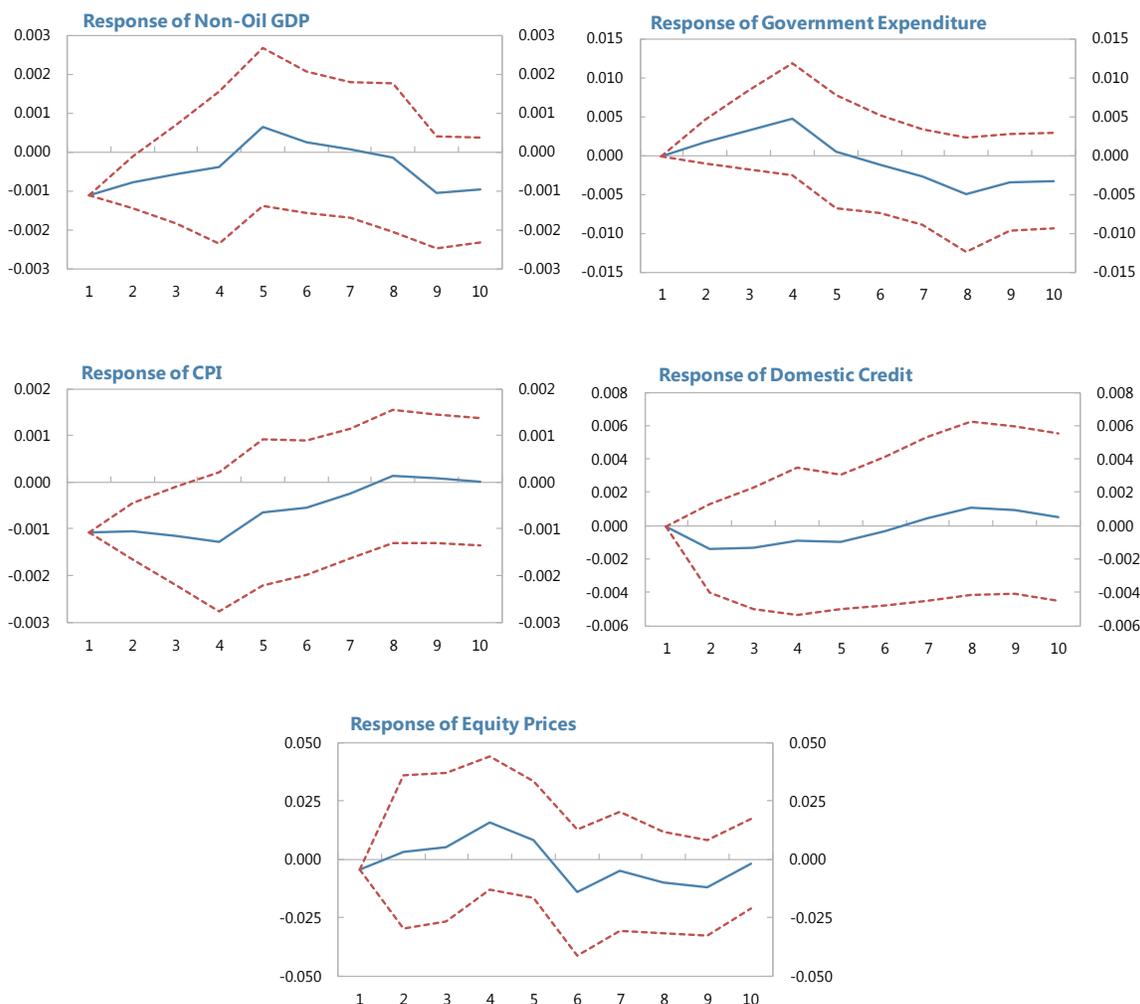
- Oil prices have a significant and sustained impact on key economic and financial variables (Figure 10). A one standard deviation negative shock to oil prices (equivalent to a 14 percent drop in oil prices) reduces equity prices, credit, government spending, inflation, and real non-oil GDP growth. The impulse responses indicate a peak impact of 5 percent, 1.1 percent, 0.8 percent, 0.2 percent, and 0.1 percent, respectively, after a 1–5 quarter lag, with some of the impacts sustained for several quarters.
- The U.S. fed funds rate is found to have a short-lived, but statistically significant impact on equity prices, non-oil real GDP growth, and inflation (Figure 11). The impulse response functions indicate that a one standard deviation positive shock to the fed funds rate, which is a rise of 35 basis points, reduces equity price growth by 0.5 percent and real non-oil GDP by 0.1 percent, respectively, in the first quarter, and CPI inflation by 0.1 percent for three quarters. The immediate impact on non-oil GDP found in the VAR is hard to reconcile with the likely relatively slow pass-through of higher U.S. rates into domestic lending rates and may be due to the interpolated nature of the quarterly data.

Figure 10. Impact of Oil Prices on Real and Financial Variables



Source: SAMA; authors' calculations

1/ Shows response to a one standard deviation shock to oil prices. All variables in log differences.

Figure 11. Impact of Fed Funds Rate on Real and Financial Variables

Source: SAMA; authors' calculations

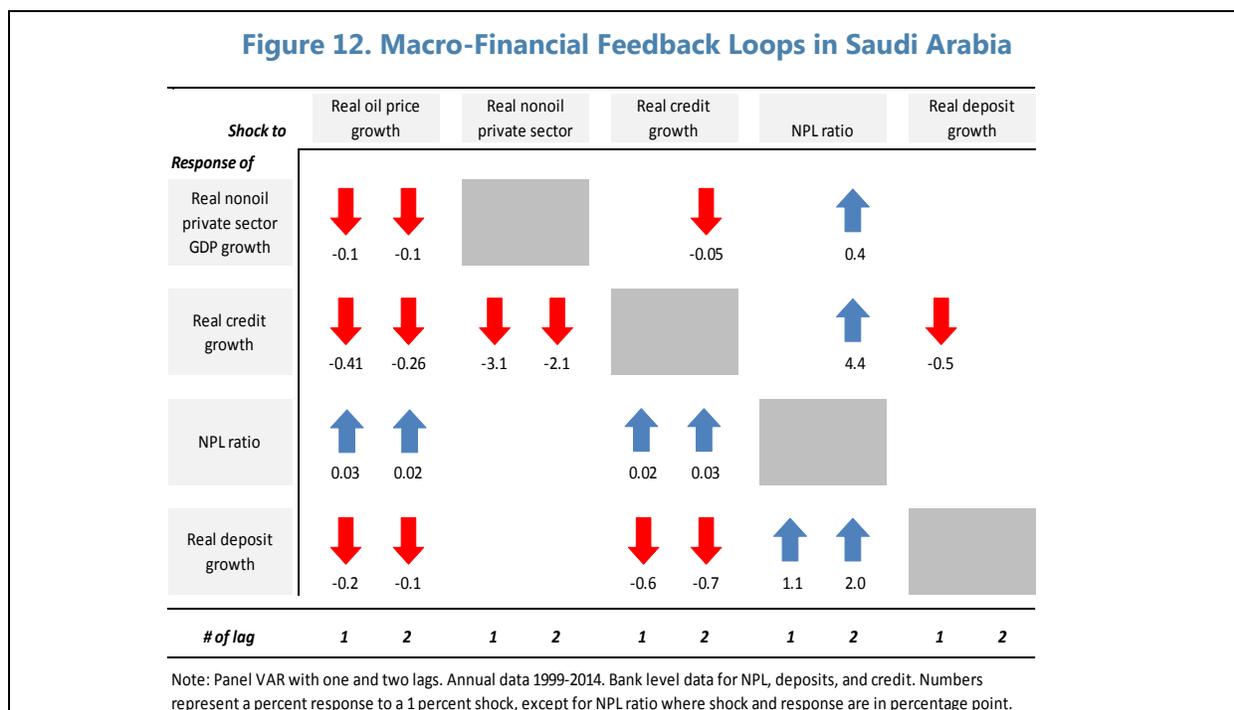
1/ Shows response to a one standard deviation shock to oil prices. All variables except fed funds rate in log differences.

A closer look at the banking sector

14. Interactions between real and financial factors are important in a changing oil price environment. Econometric estimates suggest the existence of macro-financial feedback loops in Saudi Arabia (Figure 12). A panel VAR model was estimated using variables in real terms capturing macroeconomic developments (the growth rates of oil prices and nonoil private sector GDP) and bank balance sheet conditions (NPL ratios and the growth rates of credit and deposits).⁴ Consistent

⁴ NPL ratios are used without a logit transformation. Bank-by-bank data comprises annual data for 12 banks taken from Bankscope for the period 1999–2014.

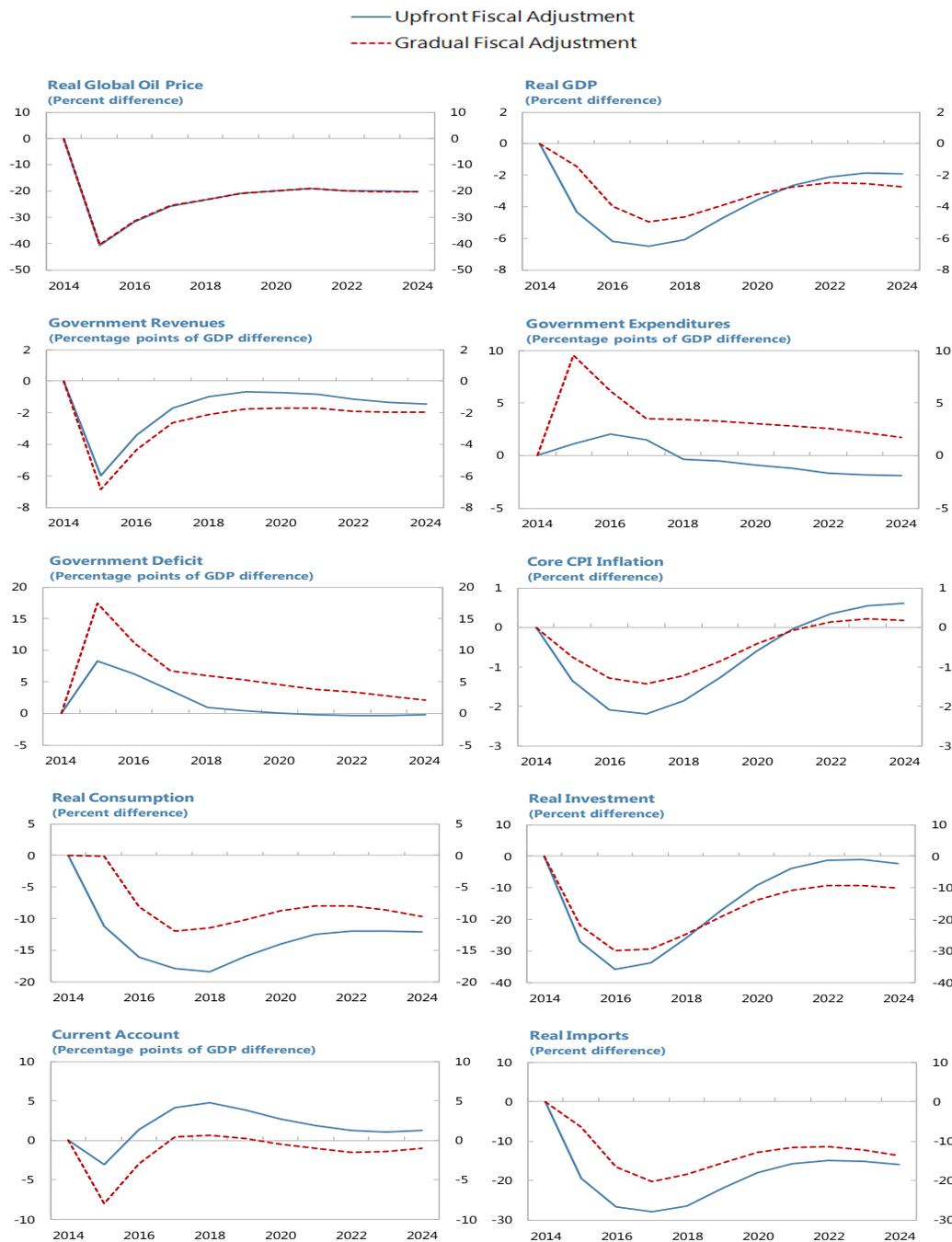
with results reported in the accompanying paper (IMF, 2015), NPL ratios rise after the growth rates of oil prices and non-oil GDP decline (the latter through lower credit growth). Deposit growth declines as do the growth rates of non-oil GDP and credit. So, for example, a 1 percent decline in oil prices leads to a 0.3-0.4 percent decline in credit growth, a 0.1-0.2 percent decline in deposit growth, and higher NPLs. There is a feedback effect within bank balance sheets, as solvency risk and liquidity risk reinforce each other (higher NPLs lead to lower deposit growth and vice versa through a reduction in credit growth).



C. Model Simulations of the Impact of Lower Oil Prices on the Saudi Economy

15. G20MOD, a module of the IMF's Flexible System of Global Models, can be used to assess the impact of lower oil prices on the Saudi economy. G20MOD is a 25-bloc global general equilibrium model encompassing each of the G-20 countries and 5 additional blocs that effectively complete the rest of the world (see Andrle and others, 2015, and the annex for features salient to these simulations). To broadly mimic the decline in oil prices to date and the partial recovery priced into futures markets in the coming years, an initial 40 percent decline in oil prices is simulated with one-half of this decline being subsequently reversed (Figure 13).

Figure 13. Impact of Lower Oil Prices in Saudi Arabia—Results from G20MOD



Source: IMF G-20 Model.

16. The model results are consistent with the earlier analysis and emphasize the importance of the fiscal policy response in determining the initial impact on the real economy. As oil prices decline, export and fiscal revenues decline relative to the baseline, and the fiscal balance and current account weaken. The extent of this weakening depends on the response of government spending. If the government initially maintains spending in nominal terms (rising as

a percent of GDP given the fall in nominal GDP) and uses its buffers to finance the large deficit, the impact on real GDP is initially more limited. If it undertakes an upfront fiscal adjustment, the short-term impact on real GDP is larger, but the widening of the deficit and use of the fiscal buffers more limited. Real GDP falls below the baseline since consumption and investment decline as consumers and firms respond to the decline in government spending and national wealth. The impact on real GDP is affected by the composition of the fiscal adjustment. Cuts in transfers have the least effect on real GDP, followed by reductions in current expenditure and increases in distortionary taxes, with the greatest impact being from cuts in spending on infrastructure. Imports contract, partly offsetting the impact of the decline in oil revenues on the current account balance. As real GDP falls, inflation eases (the oil price drop does not affect inflation because domestic energy prices are fixed). Since the nominal exchange rate is pegged to the U.S. dollar, the policy rate does not respond to the weakening domestic economy and the downward pressure on inflation, pushing up the real interest rate which further weakens private consumption and investment. Over time, the rebound in oil prices partially reverses some of the initial impact on real GDP and other variables, and in the case of the upfront fiscal adjustment, expenditure is able to return closer to original levels, and offset some of the loss of real GDP.

D. Conclusions and Policy Implications

17. The decline in oil prices and the expected increase in U.S. interest rates will have implications for the future path of the Saudi economy. The analysis in this paper makes it clear that oil prices are a key determinant of macroeconomic and financial outcomes in Saudi Arabia. The impact of higher interest rates is harder to determine, but while interest rates may be a less important determinant of activity than oil prices, there is still likely to be some effect on the economy.

18. The duration of the oil price decline will be a key factor in determining the economic and financial impact on Saudi Arabia. Substantial fiscal and financial buffers have been built-up in recent years, and these can be used to smooth the impact of lower oil prices in the near-term. However, a longer-lasting decline in oil prices will require fiscal adjustment, which will impact growth and the banking sector.

19. Fiscal, financial, and structural policies will be important in managing the impact of lower oil prices and higher interest rates. While the substantial fiscal buffers mean there is no need for a knee-jerk reduction in fiscal spending, a medium-term fiscal consolidation plan needs to be established and a gradual adjustment started. This will allow the government to continue to focus on key development priorities while reducing medium-term fiscal risks that would build if spending does not adjust over time to lower oil prices. On the financial sector side, careful monitoring of the banking and broader financial system is needed to identify any emerging stresses at an early stage so that prompt policy actions can be taken as needed. On the structural side, continued reforms to support the diversification of the economy away from oil would provide a boost to non-oil growth and help offset the impact of weaker government spending.

Annex I. A Summary of the IMF's G20MOD Module of FSGM

This annex provides a broad summary of G20MOD, a module of the IMF's Flexible System of Global Models (FSGM). The model is presented in greater detail in Andrle and others (2015).

1. G20MOD is an annual, multi-economy, forward-looking, model of the global economy combining both micro-founded and reduced-form formulations of economic sectors.

G20MOD contains individual blocks for the G-20 countries, and 5 additional regions to cover the remaining countries in the world. The key features of a typical G20MOD country model are outlined below, noting any special circumstances that are applied for Saudi Arabia.

2. Consumption and investment have microeconomic foundations. Specifically, consumption features overlapping-generations households that can save and smooth consumption, and liquidity-constrained households that must consume all of their current income every period. Firms' investment is determined by a Tobin's Q model. Firms are net borrowers and their risk premia rise during periods of excess capacity, when the output gap is negative, and fall during booms, when the output gap is positive. This mimics, for example, the effect of falling/rising real debt burdens.

3. Trade is pinned down by reduced-form equations. They are a function of a competitiveness indicator and domestic or foreign demand. The competitiveness indicator improves one-for-one with domestic prices—there is no local-market pricing. For Saudi Arabia, most exports are oil, so competitiveness changes play a small role in the model.

4. Potential output is endogenous. It is modeled by a Cobb-Douglas production function with exogenous trend total factor productivity (TFP), but endogenous capital and labor. For Saudi Arabia, potential output also moves one-for-one with the long-run average production of oil (but not cyclical swings in oil production).

5. Consumer price and wage inflation are modeled by reduced form Phillips' curves. They include weights on a lag and a lead of inflation and a weight on the output gap. Consumer price inflation also has a weight on the real effective exchange rate and second-round effects from food and oil prices. Given that energy prices in Saudi Arabia do not respond to global oil price developments, there is no feed-through from oil price changes to CPI inflation in the Saudi Arabia bloc. While the role of expatriate labor in Saudi Arabia is not directly modeled, the effects are approximated by having a low-weight on the output gap.

6. Monetary policy is governed by an interest rate reaction function. For most countries, it is an inflation-forecast-based rule working to achieve a long-run inflation target. For Saudi Arabia, the monetary reaction function defends its fixed nominal exchange rate against the U.S. dollar. This means in tandem with the risk-adjusted uncovered interest rate parity condition, Saudi Arabia must, in the face of shocks, set its monetary policy interest rate equal to that of the United States in order to defend its peg.

7. There are three commodities in the model—oil, metals, and food. This allows for a distinction between headline and core consumer price inflation, and provides richer analysis of the macroeconomic differences between commodity-exporting and importing regions. The demand for commodities is driven by the world demand and is relatively price inelastic in the short run due to limited substitutability of the commodity classes considered. The supply of commodities is also price inelastic in the short run. Countries can trade in commodities, and households consume food and oil explicitly, allowing for the distinction between headline and core CPI inflation. All have global real prices determined by a global output gap (only a short-run effect), the overall level of global demand, and global production of the commodity in question.

8. Commodities can function as a moderator of business cycle fluctuations. In times of excess aggregate demand, the upward pressure on commodities prices from sluggish adjustment in commodity supply relative to demand will put some downward pressure on demand. Similarly, if there is excess supply, falling commodities prices will ameliorate the deterioration.

9. In Saudi Arabia, oil is the only commodity that is produced and exported, and is a dominant feature of the model. Exports of oil respond largely to Saudi production decisions. Eighty-five percent of oil revenues are assumed to accrue to the government, the remainder to Aramco, the state oil company. This means that oil price fluctuations affect government revenues, but have little effect on household wealth as households have no direct ownership stake in the oil sector. Oil prices also have little effect on households' and firms' decisions, as oil prices are held fixed domestically. The government, which has a large stock of financial assets, is assumed to set long-run fiscal policy with the aim of maintaining this asset stock, although in the short-run fiscal policy can result in significant deviations away from this target.

10. Countries are largely distinguished from one another in G20MOD by their unique parameterizations. Each economy in the model is structurally identical (except for commodities), but with different key steady-state ratios and different behavioral parameters. As noted above, the parameterization of Saudi Arabia is strongly determined by the fact that its economy is dominated by oil.

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ASSESSING THE RESILIENCE OF SAUDI BANKS TO WEAKER ECONOMIC CONDITIONS¹

Banks in Saudi Arabia are profitable, liquid, and well-capitalized. Nevertheless, the recent sharp decline in oil prices is likely to impact the banking system, particularly if it is sustained. Scenario analyses relying on publicly available bank-by-bank data suggest that: (i) banks are well positioned to weather the impact of an increase in nonperforming loans (NPLs), lower profits, and weaker deposit inflows that may come with an extended period of lower oil prices and weaker nonoil GDP growth; and (ii) bank capital and liquidity would only be put under significant pressure in the event of a very sharp economic downturn, sustained very low oil prices, and substantial deposit withdrawals.

A. Background

1. Commercial banks in Saudi Arabia are profitable, liquid, and well-capitalized. On average, NPLs are low at 1.1 percent of gross loans, the capital adequacy ratio is 17.8 percent, and provisions have increased to 183 percent of NPLs.² Overall, corporate balance sheets are in good shape. The Saudi Arabian Monetary Agency (SAMA)'s regulation and supervision of the banking system has continued to strengthen in recent years, including through the early adoption of Basel III capital and liquidity standards.

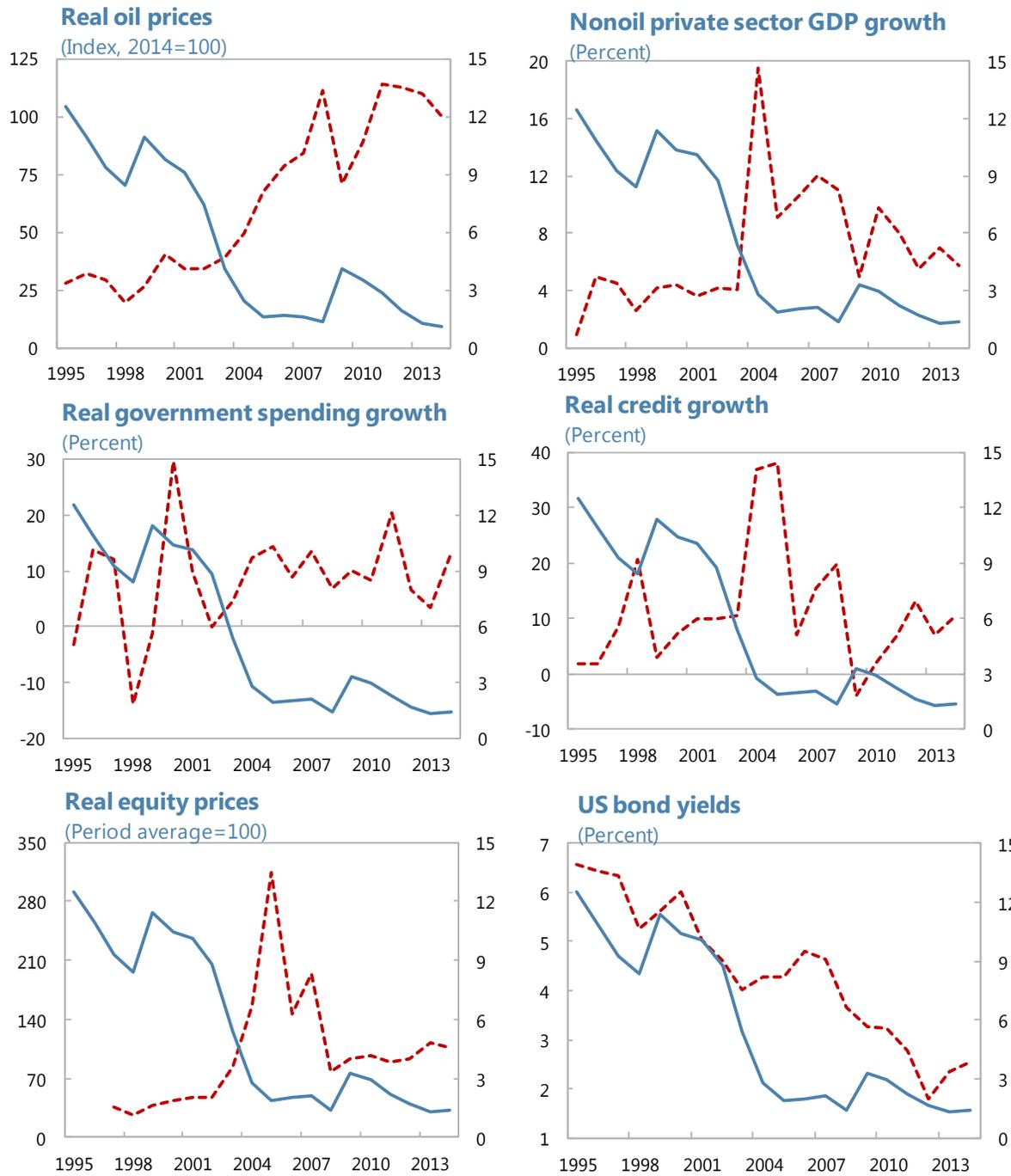
2. Historically, NPLs seem to have been influenced by oil prices, government spending, and growth in the non-oil sector (Figure 1). Sustained lower oil prices would over time lead to fiscal tightening and reduce the growth rates of nonoil private sector GDP and real credit extension. As economic activity moderates, equity prices would decline, creating negative wealth effects. As a result, the creditworthiness of borrowers would worsen and liquidity conditions tighten, increasing bank NPLs. Higher interest rates as the U.S. starts to tighten monetary policy would also raise borrowing costs and could put additional pressure on asset quality. On the liquidity side, deposits have historically been correlated with oil prices—lower oil prices reduce income and deposit inflows, or even trigger a draw down, particularly by companies most affected by the price drop.

¹ Prepared by Ken Miyajima.

² Based on the publicly available bank-by-bank data used in this note.

Figure 1. Key Economic Indicators in Saudi Arabia, 1995–2014

— NPLS (Percent of Total Loan, RHS)



Source: IMF Staff Calculations

3. The 2011 Financial Sector Assessment Program (FSAP) Update looked in detail at the resilience of the banking system to asset quality and liquidity shocks. It concluded that the domestic banking system is generally resilient to a wide range of asset quality and liquidity shocks and would only come under pressure if hit by a severe stress event. Starting from an NPL ratio of 3 percent, provisions covering about 116 percent of NPLs, and a capital ratio of 17.7 percent, the aggregate capital ratio was found to remain above 8 percent for almost all of the individual shocks considered. However, if oil prices remained at \$40 a barrel and real GDP growth stagnant for four years, the aggregate capital ratio would decline to 5.2 percent. The liquidity risk assessment in the 2011 FSAP also suggested the resilience of the banking system to most liquidity shocks.

4. This note does not try to update the detailed stress tests conducted in the 2011 FSAP or preempt those that may be carried out in a future FSAP. Rather, it uses publicly available bank-by-bank data, regression analysis, and a range of economic scenarios to revisit the possible impact of lower oil prices and higher interest rates on Saudi banks. The results should be interpreted with a range of caveats in mind. First, the information content of publicly available bank-level balance sheet data is relatively limited compared with the regulatory data typically used for FSAP assessments. Second, any analysis based on historical data might not always account for the effects of recent changes in policy frameworks. Third, the data spanning 1999–2014 may not capture a sufficient number of oil price and financial cycles. Fourth, there is considerable parameter uncertainty surrounding the estimated relationship between macroeconomic shocks and NPL ratios. This is discussed in more detail below.

B. Bank balance sheet quality under weaker economic conditions

5. NPLs in Saudi Arabia appear to be driven by oil prices and nonoil private sector growth. The relationship between macro and financial market variables and NPLs ratios was estimated through panel data econometric techniques. The analysis relied on publicly available bank-by-bank data on balance sheets and profit/loss accounts, focusing on banks for which sufficient data are available for 1999–2014. The econometric approach employed broadly follows Espinoza and Prasad (2010) who analyzed NPLs in the GCC banking system relying on panel data techniques.³ The results suggest that the growth rates of real oil prices and nonoil private sector GDP are key determinants of bank-level NPL ratios (Table 1).⁴ By contrast, real government spending growth and domestic and U.S. interest rates are not found to directly affect NPL ratios in a

³ The NPL ratio exhibits a strong autocorrelation and the data's time series dimension is short relative to its cross-sectional dimension. This argues for a GMM estimation approach rather than a fixed effects approach—the latter suffers from a downward Nickell bias in such circumstances. Indeed, the coefficient on the autoregressive NPL ratio is smaller when estimated using a fixed effects approach. This would make the trajectory of projected NPL ratios higher compared to the results reported in this note.

⁴ NPL ratios are introduced after a logit transformation. Fisher-type panel unit root tests reject the null hypothesis that all panels contain unit roots. Time dummy variables were introduced in the regressions to control for events other than oil price developments that potentially led to an increase in NPL ratios around the time of the global financial crisis. In particular, two large family-owned conglomerates defaulted on loans in 2009 due to events unrelated to the decline in oil prices.

systematic way (not shown in the table). When regressed together with the growth rates of real oil prices and nonoil private sector GDP, the coefficients of real equity price growth are statistically significant only in one specification while those on bank-level real credit growth are not statistically significant. The 2008/09 time dummy is significant across all specifications.

Table 1. Determinants of Bank NPLs in Saudi Arabia

Model number	1	2	3	4	5	6	7	8	9
Logit of NPL ratio (L1)	0.944***	0.911***	0.957***	0.895***	0.845***	0.954***	0.855***	0.852***	0.964***
Real oil prices, % change (L1)	-0.011***	-0.010***	-0.011***	-0.010***	-0.009***	-0.011***	-0.009***	-0.009***	-0.011***
Nonoil private sector GDP growth, % (L1)	-0.132***	-0.127***	-0.004	-0.113***	-0.098**	-0.002	-0.100**	-0.101*	-0.001
Real credit growth, % (L1)		-0.001			-0.001			-0.001	
Real equity price growth, % (L1)			0.002			0.002			0.003**
2008/09 dummy	0.434**	0.436**	1.045***	0.448**	0.489**	1.048***	0.493**	0.485**	1.061***
Number of observations	126	126	126	126	126	126	126	126	126
Lag depth of GMM instruments	1	1	1	2	2	2	3	3	3
P values									
AR(1)	0.012	0.012	0.024	0.012	0.019	0.029	0.023	0.025	0.021
AR(2)	0.317	0.591	0.774	0.344	0.609	0.830	0.461	0.511	0.850
Hansen	0.160	0.609	0.041	0.063	0.103	0.123	0.766	1.000	0.203

Note: Dependent variable is bank-by-bank (logit transformed) NPL ratio for 9 Saudi Arabian banks spanning 1999-2014 (annual frequency). Relying on a system GMM approach. The coefficients represent non-linear effect that depends on starting levels. ***, **, and * signify significance at the 1%, 5% and 10% levels. L1 signifies one period lag. AR(1) and AR(2) signify p-values associated with the null hypothesis of lack of first and second order serial correlation. Hansen signifies p-value associated with the null hypothesis that the instruments are exogenous.

Sources: Bankscope, Haver, Bloomberg, and staff estimates.

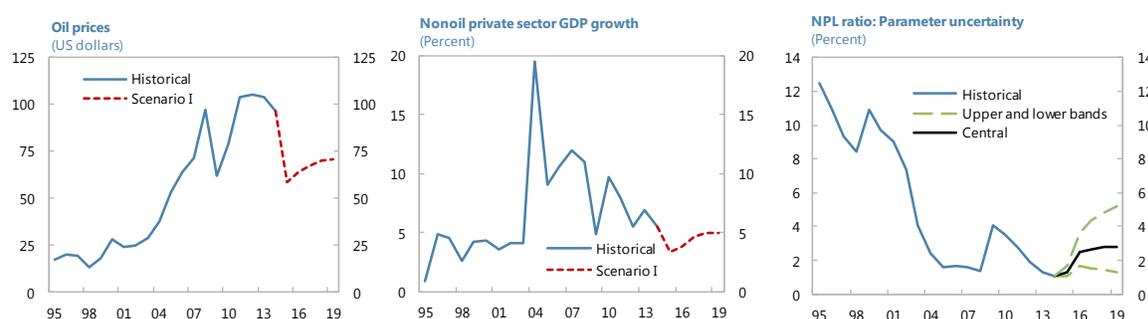
6. Using these parameter estimates and projections of oil prices and nonoil private sector GDP growth, the future estimated path of bank-level NPLs can be derived.⁵ Based on the estimated relationship, NPL ratios are projected for the individual banks for 2015–19, starting from NPL ratios at end-2014, as new NPLs accumulate according to the baseline trajectories of oil prices and nonoil private sector GDP growth. Oil prices and nonoil private sector GDP growth follow the central projections by IMF staff. In particular oil prices decline from an average of \$96 a barrel in 2014 to \$59 a barrel in 2015, and recover to \$71 a barrel in 2019 (Figure 2, left panel). Nonoil private sector GDP growth moderates from 5.6 percent in 2014, to 3.4 percent in 2015 and 3.8 percent in 2016, respectively, and stabilizes at 5 percent (center panel). Under these assumptions, the aggregate NPL ratio on average rises gradually to 2.8 percent by 2019 (right panel), with the underlying bank level NPL ratios ranging between 2.2–3.2 percent. Using the range of autoregressive coefficients suggested by the regression results, the aggregate NPL ratio in 2019 could be between 1.3–5.2 percent (right panel).⁶

⁵ Real oil prices used for regression and projection are converted to nominal prices for discussion. Using the simple average of prices of U.K. Brent, Dubai Fatch, and West Texas Intermediate crude oil.

⁶ The range is estimated considering only the coefficients on the autoregressive term which has a large impact on the projected path of NPL ratios. Other sources of uncertainty include the estimated coefficients. Following Espinoza and Prasad (2010), bank by bank variables are considered as endogenous and aggregate variables predetermined in this analysis.

7. Given the NPL path, balance sheets and profit/loss accounts are simulated for the individual banks. Liabilities remain constant while interest margins on current loans and liabilities, as well as net non-interest income, decline from each banks' historical level. This assumption reflects potential margin compression due to slower economic activity, weaker credit demand, and potentially greater competition for funding. New NPLs are assumed to be provisioned at 120 percent, above regulatory requirements of 100 percent. This further dents profits. When the capital ratio declines in the previous period, and provided that net income is positive in the current period, it is assumed that the bank builds capital by allocating 50 percent of profits. The rest is paid out as dividends. When net income is negative, capital covers the loss.

Figure 2. NPL Ratio and its Key Determinants: Historical and Scenario I



Source: IMF Staff Estimates.

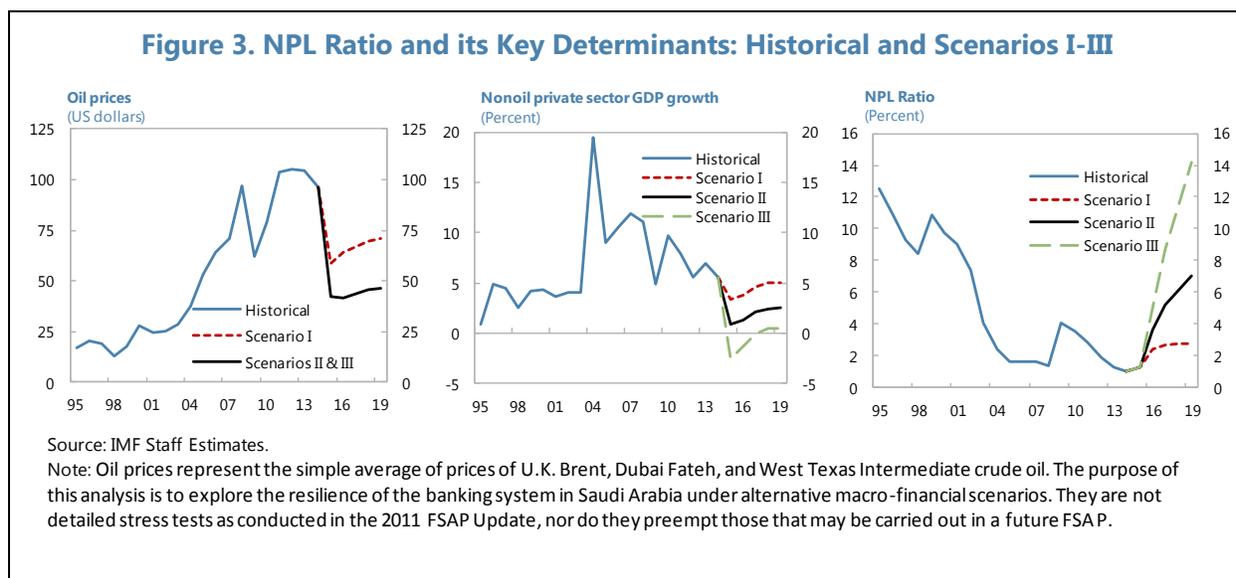
Note: Oil prices represent the simple average of prices of U.K. Brent, Dubai Fateh, and West Texas Intermediate crude oil. The purpose of this analysis is to explore the resilience of the banking system in Saudi Arabia under alternative macro-financial scenarios. They are not detailed stress tests as conducted in the 2011 FSAP Update, nor do they preempt those that may be carried out in a future FSAP.

8. Simulation results suggest that banks can comfortably withstand higher NPLs and lower profits under this economic scenario. The finding owes to Saudi banks' strong starting position, with low NPLs, adequate provisioning, and solid profitability. Based on the abovementioned assumptions and the central path of the NPL ratio, the average capital ratio remains above 18 percent (Table 2, Scenario I). This is despite 120 percent of new NPLs being provisioned, which dents profits but helps maintain provisions at above 140 percent of total NPLs.

9. A second scenario was considered in order to assess the resilience of the banking system to a sharper fall in oil prices and nonoil private sector GDP growth. In scenario II, oil prices are assumed to fall from \$96 a barrel in 2014 to \$44 a barrel in 2015 and remain little changed, while nonoil private sector GDP growth declines to 0.8 percent in 2015 and 1.3 percent in 2016, before stabilizing at 2.5 percent (these are 1.5 and 1 standard deviations below the levels assumed in scenario I, respectively). Bank profitability moderates further and banks provision 100 percent of new NPLs.

10. The banking system continues to be resilient to the shock in scenario II (Figure 3).

NPLs rise to 7 percent and provisions cover about 1.1 times the stock of NPLs. Despite profitability declining and provisioning needs rising, the capital ratio declines only moderately to around 17 percent in aggregate. For one bank, the capital ratio declines below 12 percent, but remains above the 8 percent international regulatory minima. SAMA implicitly sets the regulatory capital minima equal to 12 percent, 4 percentage points above Basel requirements.⁷



11. A third scenario is constructed to estimate the extent of GDP growth slowdown that would be needed to reduce the average capital ratio to 12 percent in 2019. In scenario III, all assumptions other than the trajectory of nonoil private sector GDP growth remain unchanged. To push the average capital ratio to 12 percent, nonoil private sector GDP would need to contract by 2.6 percent in 2015 and then remain flat on average between 2016–19 (Figure 3). The last time private nonoil growth contracted was in 1987. The NPL ratio would increase to 14.1 percent in 2019 in this scenario according to the regression results. Bank level capital ratios would fall below 12 percent for 8 banks of which 5 banks would maintain capital ratios above 8 percent (Table 2, Scenario III). Resources required to bring the 8 banks' capital ratios back to 12 percent are small.

⁷ Staff estimates suggest that for banks in Saudi Arabia the minimum capital requirement after accounting for concentration risk could reach 12–13 percent of risk-weighted assets. See IMF (2014).

Table 2. Effects of Economic Scenarios on the Banking Sector

	2014	2015	2016	2017	2018	2019
	Historical	Scenario I				
Assumptions						
Nonoil private sector growth (percent)	5.6	3.4	3.8	4.7	5.0	5.0
Oil prices (US dollars)	96	59	64	67	70	71
Impact						
Nonperforming loans (percent of total loans)	1.1	1.3	2.5	2.7	2.8	2.8
Provisions (percent of NPLs)	182.9	173.2	148.4	146.2	145.3	145.2
Capital adequacy ratio	17.8	18.5	18.6	18.6	18.6	18.6
CAR < 8 percent						
Number of banks	0	0	0	0	0	0
8 percent < CAR < 12 percent						
Number of banks	0	0	0	0	0	0
CAR > 12 percent						
Number of banks	12	12	12	12	12	12
	Historical	Scenario II				
Assumptions						
Nonoil private sector growth (percent)	5.6	0.8	1.3	2.1	2.5	2.5
Oil prices (US dollars)	96	44	43	44	44	44
Impact						
Nonperforming loans (percent of total loans)	1.1	1.3	3.7	5.2	6.2	7.0
Provisions (percent of NPLs)	182.9	170.1	125.3	117.8	114.9	113.2
Capital adequacy ratio	17.8	18.4	18.0	17.8	17.4	16.9
CAR < 8 percent						
Number of banks	0.0	0	0	0	0	0
8 percent < CAR < 12 percent						
Number of banks	0.0	0	0	0	1	1
CAR > 12 percent						
Number of banks	12.0	12	12	12	11	11
	Historical	Scenario III				
Assumptions						
Nonoil private sector growth percent	5.6	-2.6	-1.3	0.0	0.5	0.5
Oil prices (US dollars)	96	44	43	44	44	44
Impact						
Nonperforming loans (percent of total loans)	1.1	1.3	5.1	8.7	11.6	14.1
Provisions (percent of NPLs)	182.9	170.1	118.3	110.7	108.0	106.5
Capital adequacy ratio	17.8	18.4	17.1	15.4	13.8	12.0
CAR < 8 percent						
Number of banks	0.0	0	0	0	1	3
8 percent < CAR < 12 percent						
Number of banks	0.0	0	0	2	4	5
CAR > 12 percent						
Number of banks	12.0	12	12	10	7	4

Note: Oil prices represent the simple average of prices of U.K. Brent, Dubai Fateh, and West Texas Intermediate crude oil. Nominal oil prices are deflated by inflation for regression and scenario analysis. The purpose of this analysis is to explore the resilience of the banking system in Saudi Arabia under alternative macro-financial scenarios. They are not detailed stress tests as conducted in the 2011 FSAP Update, nor do they preempt those that may be carried out in a future FSAP.

12. The impact of the decline in oil prices on bank deposits is likely to be manageable.

Historically, bank deposits have been correlated with oil prices (and with the NPL ratio). Results of a panel vector auto regression using annual bank-by-bank data for 1999–2014 suggest that the growth rate of deposits in real terms slows by 0.1–0.2 percent in response to a one percent decrease in real oil prices, or by 1–2 percent in response to a one percentage point increase in the NPL ratio (see IMF (2015)). Taking the results at face value, the recent 40 percent decline in oil prices, if sustained for one year, would lead to a 4–8 percentage point reduction in deposit growth, everything else constant. The ability of Saudi banks to manage a much larger deposit withdrawal is discussed in Box 1.

Box 1. The Resilience of Saudi Banks to Deposit Withdrawals

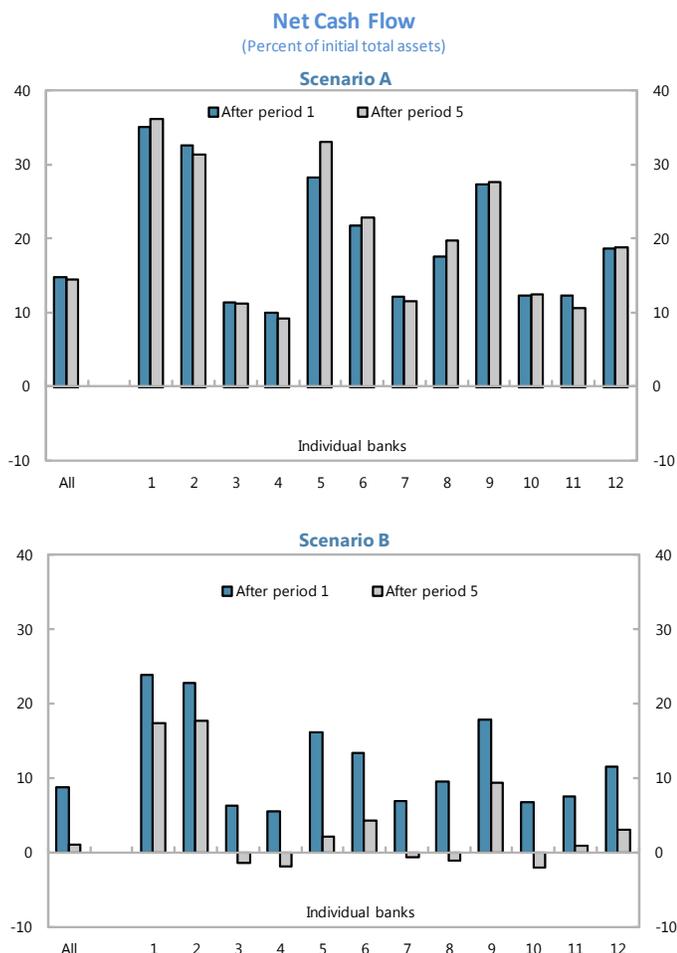
Liquidity positions in the Saudi banking system are well managed. Banks hold sufficient high-quality liquid assets to already bring both the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) above the regulatory minimum requirements proposed by Basel III (see SAMA (2015)).

The impact of more severe scenarios where banks actually experience significant deposit withdrawals can be considered. The extent to which banks can accommodate deposit reductions by selling liquid (and to some extent illiquid) assets within a 30-day window (divided into five periods, six days each) can be investigated. In the scenarios, withdrawal rates vary by the type of deposits, with demand deposits suffering higher runoff rates. During times of market stress, banks would not be able to convert all their liquid assets into cash at face value. Moreover, some liquid assets are encumbered in margin calls—a higher amount of assets are encumbered during a more severe scenario to meet greater collateral demand. Two scenarios are parameterized to calibrate Saudi Arabia’s historical experience, guided to some extent by Schmieder et al. (2012) (Figure).

- In scenario A**, demand and time deposits decline by 2 percent and 1 percent per period, respectively, or by an average of 8 percent over the 30 day period. This is higher than the largest monthly reduction observed since 1993 which was 6 percent. 95 percent of liquid assets are available for sale in each 5-day period (2 percent for illiquid assets). Liquid assets are sold with a moderate 1 percent haircut (15 percent for illiquid assets) and 10 percent of liquid assets are encumbered (25 percent of illiquid assets), both reducing the capacity of banks to generate cash.
- Scenario B** is characterized by a faster deposit run and tighter market liquidity conditions. Deposits decline by more than 10 percent during a 30 day window, a rate similar to the 11 percent reduction within a week suffered in 1990 (when the run was triggered by a military conflict rather than an oil price decline). Smaller shares of assets are available for sale (85 percent for liquid assets and 1 percent for illiquid assets). Banks face higher rates of haircut (5 percent and 30 percent) and encumbrance (20 percent and 50 percent).

The results suggest that the banking sector is generally resilient to the deposit withdrawals, although some liquidity shortfall emerges in scenario B.¹ In scenario A, there is no liquidity shortfall for the banking sector as a whole or for any individual bank. In scenario B, the aggregate banking system remains liquid, but five banks suffer liquidity shortages by 1–2 percent of initial assets (banks #3,4,7,8,10). Similar to the asset quality scenarios, the assessment needs to be interpreted with the range of assumptions in mind.

¹This analysis assumes lower rates of deposit runoff, haircut and encumbrance than those suggested in Schmieder et al. (2012).



Source: IMF Staff Estimates.

Note: The purpose of this analysis is to explore the resilience of the banking system in Saudi Arabia under alternative macro-financial scenarios. They are not detailed stress tests as conducted in the 2011 FSAP Update, nor do they preempt those that may be carried out in a future FSAP.

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COUNTERCYCLICAL MACROPRUDENTIAL POLICIES IN SAUDI ARABIA¹

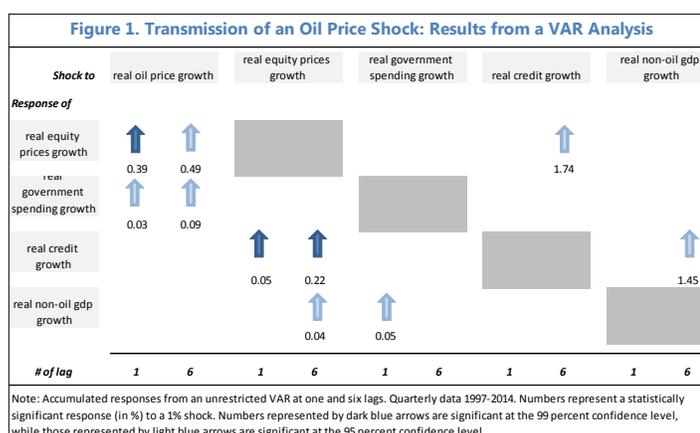
Oil prices drive asset prices and government spending in Saudi Arabia, which in turn, are transmitted to credit and non-oil GDP. With oil prices having declined sharply in recent months and growth risks to the downside, the environment in which the financial sector is operating may become more difficult. Saudi Arabia has implemented a wide range of macroprudential policies, including some in a countercyclical way, to strengthen capital and liquidity buffers in the banking system. In addition, expanding the use of countercyclical macroprudential policies within the context of the establishment of a formal macroprudential framework, while respecting microprudential norms, may help in mitigating adverse feedback loops between real and financial activity.

A. Introduction

1. Macroprudential policies can help mitigate systemic risks to financial stability that result from macro-financial linkages. Macro-financial linkages increase the vulnerability of the economy to systemic risks by amplifying idiosyncratic or aggregate shocks. Macroprudential policies can help mitigate these risks by building buffers to increase the resilience of the financial system, containing the build-up of systemic vulnerabilities by reducing procyclical feedback between asset prices and credit, and controlling structural vulnerabilities within the financial system. This paper examines how countercyclical macroprudential policies have been used in Saudi Arabia to mitigate systemic risks over the financial cycle and what more needs to be done. While the dependence on oil creates structurally high concentration risks within the financial system (e.g. Aljabrin et al, 2014), the use of macroprudential policies to mitigate those risks is not addressed in this paper.

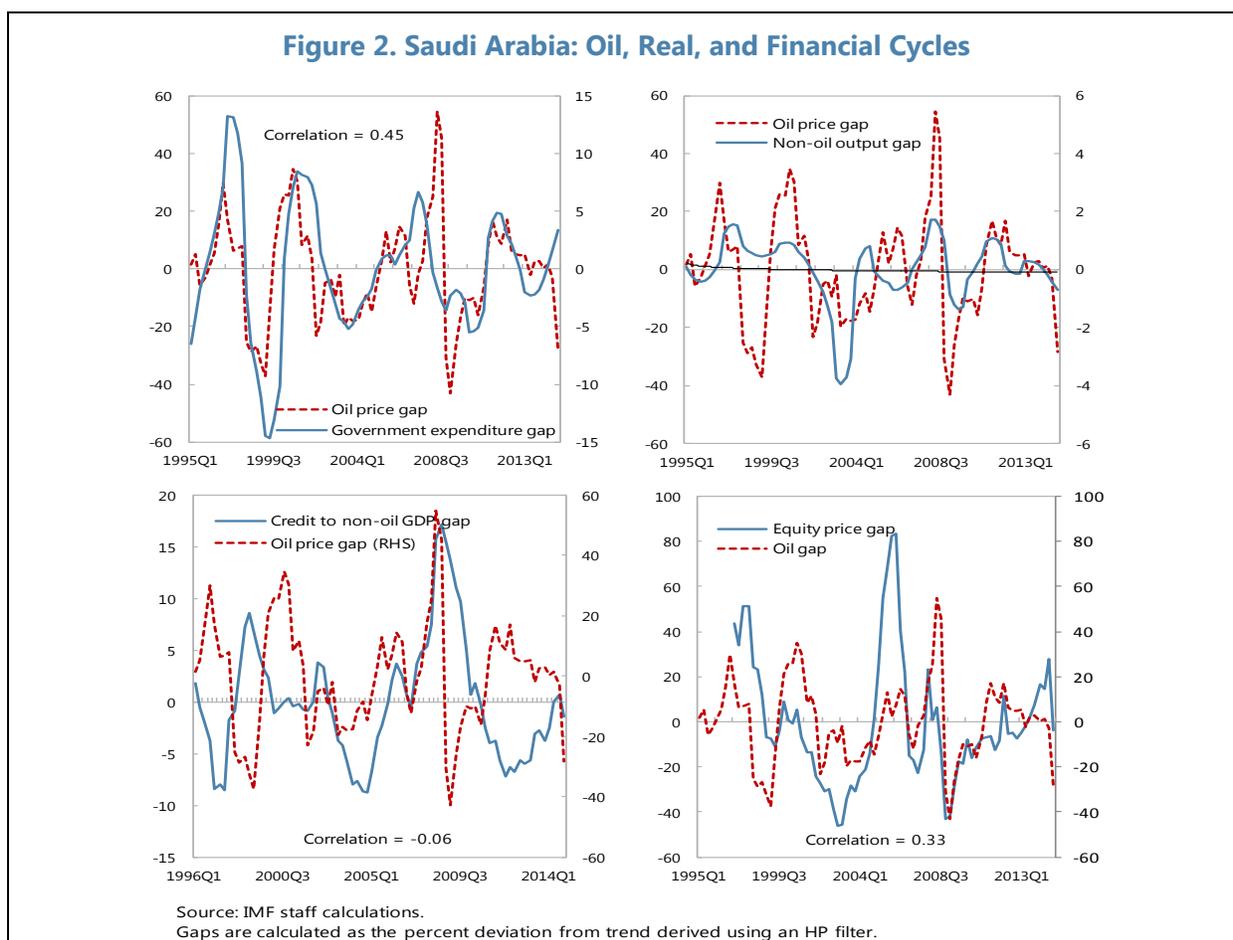
B. Oil Prices Drive Real and Financial Cycles

2. Saudi Arabia is a highly oil-dependent economy. Oil exports are over 70 percent of non-oil GDP and 80 percent of total exports. With oil revenues nearly 90 percent of central government revenues, they have financed rapid increases in government spending over the past decade.



¹ Prepared by Hussain Abusaaq, Ayman Alfi, Padamja Khandelwal, Ken Miyajima, and Ben Piven.

3. There is strong evidence suggesting that oil prices drive asset prices and government spending. A VAR analysis using quarterly data, finds evidence of a statistically significant positive response of equity prices and government spending to increases in oil prices (Figure 1).² These increases in equity prices and government spending are then transmitted to higher credit and non-oil GDP. The increase in credit and non-oil GDP create a mutually reinforcing cycle as they feedback to higher equity prices. A complementary analysis used a backward-looking univariate HP filter to detrend real oil prices, real equity prices, real government spending, real credit, and real non-oil GDP, and found strong contemporaneous correlation between cycles in oil prices, government spending, equity prices, and non-oil GDP (Figure 2). These results are consistent with the existence of feedback loops between asset prices and credit driven by oil price movements.



² An unrestricted VAR was run to capture the dynamics between five real and financial sector variables. The variables included were real oil prices (deflated by US CPI), real equity prices, real government spending, real credit from domestic banks to non-bank private sector, and real non-oil GDP. Data for equity prices, government spending and credit were deflated using Saudi CPI. Quarterly data from 1996–2014 was used for oil prices, equity prices and credit, while government spending and real non-oil GDP were interpolated from an annual series using a quadratic trend. The VAR was specified in log first differences, with 1, 4 and 5 lags.

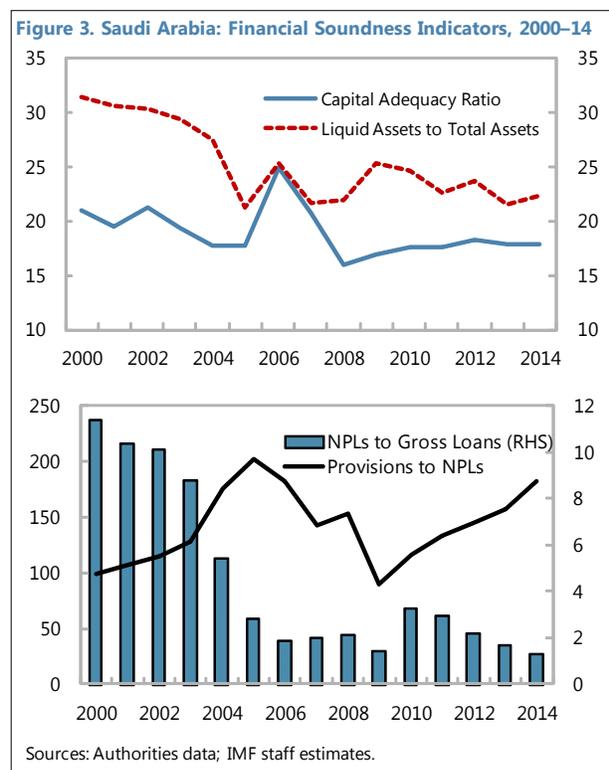
4. The exposure to oil cycles suggests a need for countercyclical macroprudential policies to mitigate the buildup of financial risks. Of course, fiscal policy is the main policy tool for managing aggregate demand and ensuring sustainability. However, the financial sector in Saudi Arabia is fairly large, and can be a source of significant adverse real sector effects.³ In this regard, macroprudential policy, if implemented in a countercyclical way, can be used to reduce the buildup of systemic risks in the financial sector during oil price upswings, and to cushion against disruption to financial services during oil price downswings.

C. Countercyclical Macroprudential Policies in Saudi Arabia

5. SAMA has implemented a wide range of macroprudential instruments over the past decade (Annex I). In addition to implementing the Basel III capital and liquidity requirements, SAMA has used a number of macroprudential instruments on banks, including:⁴

- Capital tools: additions to microprudential capital adequacy ratios, leverage ratio and provisioning requirements.
- Liquidity tools: loan-to-deposit ratio, liquid-asset-to-deposit ratio, reserve requirements, liquidity coverage ratio and net stable funding ratio.
- Sectoral tools: loan-to-value (LTV) ratio on mortgages, debt-service-to-income ratio (DTI) on personal loans and consumer credit, and concentration limits on individual and large exposures.

6. Banks have been encouraged to build capital buffers and provision for NPLs in a countercyclical way as part of the supervisory process (Box 1).⁵ For instance, the minimum provisioning ratio of 100 percent of



³ Assets of commercial banks are over 130 percent of non-oil GDP, and equity market capitalization is near 115 percent of non-oil GDP. Non-bank financial intermediaries include the public pension funds, mutual funds, finance and leasing companies, and insurance companies. Excluding the public pension funds, the non-bank sector is likely to be small although relatively little data are available for this sector.

⁴ SAMA also licenses and regulates insurance and finance companies in Saudi Arabia. Some time-invariant macroprudential tools are enforced on insurance companies. Finance companies are also subject to LTV limits on mortgages.

⁵ See also Arvai et al 2014, Al-Darwish et al, 2015.

non-performing loans (NPLs) is increased to as high as 200 percent during economic upswings. Capital buffers have also moved countercyclically as bank dividend payments require SAMA approval. The countercyclical capital and provisioning has been implemented on a bilateral basis with individual banks, based on microprudential concerns such as operating performance, composition of assets, and riskiness of the loan portfolio. Considerations of aggregate macroeconomic and financial sector risks are not formally incorporated in bank-level capital buffer decisions. Reserve requirements were adjusted during the global financial crisis to manage liquidity pressures in banks. Other instruments have been introduced to limit the build-up of risks, but these have not been adjusted in a countercyclical way over time.

7. The Saudi banking sector is well-capitalized and profitable. As oil prices and credit increased rapidly over the past decade, capital buffers and provisions for NPLs have increased to levels above those in many other commodity exporting countries (Box 2). Profitability has remained strong with return on assets of about 2 percent.

8. Recently, SAMA has taken steps towards formalizing its macroprudential framework. An internal Financial Stability Committee has been established, and a dashboard of early warning indicators has been developed. The first Financial Stability Report has been published. The framework and methodology for countercyclical capital buffers (CCBs) is being developed in line with Basel guidelines.

Box 1. Countercyclical Capital and Provisioning Ratios in Saudi Arabia

Empirical evidence confirms that bank capital and provisioning buffers have been used counter-cyclically. Both the capital and provisioning ratios increase in response to higher real credit growth, oil price growth, and the credit-to-GDP gap.

Relying on a panel system GMM approach and annual data spanning 1999–2014, the capital adequacy ratio and provisioning as a share of loans, both at the bank level, were regressed on a range of macro- and micro-level indicators to help capture the Saudi economy's cyclical position. In addition to the credit-to-GDP gap (percent deviation from the linear trend), the model includes the growth rates of non-oil GDP, real oil prices, and bank-level real credit, all lagged by one period.

Both the capital and provisioning ratios have generally moved in a countercyclical manner. The coefficients of the growth rates of real credit and real oil prices, as well as of the credit-to-GDP gap, are generally positive and statistically significant, suggesting that capital adequacy ratios and loan loss provisions have been counter-cyclical with respect to these indicators. In contrast, nonoil GDP growth appears to play a limited role. The coefficients, although large, are mostly statistically insignificant. In one specification the coefficient is statistically significant but only at the 10 percent level.

Determinants of Bank-by-Bank Capital and Provision Ratios in Saudi Arabia						
Dependent variable	Capital ratio			Provisioning to loans		
	Dependent variable (L1)	1.081***	1.163***	1.108***	0.472**	0.363
Real credit growth (L1)	0.027*	0.045**	0.043**	-0.005	0	0
Nonoil GDP gap (L1)	0.11	0.174	0.287	0.066**	0.058*	0.050***
Credit to GDP gap (L1)	0.043	0.067	0.063	0.025*	0.035**	0.032**
Real oil price growth (L1)	0.01	0.014	0.024	0.007	0.006	0.006*
Constant	-1.97	-3.659	-2.727	0.332**	0.357	0.325**
Number of observations	126	126	126	127	127	127
Lag of GMM instruments	1	2	3	1	2	3
P values						
AR(1)	0.101	0.069	0.116	0.019	0.039	0.022
AR(2)	0.464	0.478	0.393	0.33	0.358	0.163
Hansen	0.584	0.905	0.963	0.423	0.402	0.714

Note: Dependent variables are bank-by-bank capital ratios and provisioning to total loans for 10 Saudi Arabian banks spanning 1999–2014 (annual frequency). Relying on a system GMM approach. ***, **, and * signify significance at the 1%, 5% and 10% levels. L1 signifies one period lag. AR(1) and AR(2) signify p-values associated with the null hypothesis of lack of first and second order serial correlation. Hansen signifies p-value associated with the null hypothesis that the instruments are exogenous. Sources: Bankscope, Haver, and IMF staff estimates.

9. With oil prices having declined sharply in recent months and growth risks to the downside, banking sector stress may emerge, calling for vigilance from policy makers. As the fiscal position adjusts, weaker government spending could pressure corporate profitability and bank balance sheets, resulting in increased nonperforming loans. At the same time, the decline in equity prices would have wealth effects depressing private sector consumption and non-oil GDP. These effects are likely to be mutually reinforcing. Moreover, if banks reduce lending or sell assets in the downturn to maintain capitalization ratios at high levels, this could further intensify pressures and cause adverse feedback loops between the real and financial sectors.⁶

Box 2. Financial Soundness Indicators in Commodity Exporting Countries

The strength of Saudi Arabia's banking sector compares favorably with other commodity exporting countries.

The banking sector is characterized by healthy capital adequacy ratios, high provisioning, and low levels of NPLs.¹ The Saudi banking system is also liquid, with relatively low loan-to-deposit ratios and liquid assets of over 22 percent of total assets, although levels have declined somewhat since the early 2000s.

Financial Soundness Indicators for Selected Commodity Exporters

	Capital Adequacy Ratio	Provisions for NPLs	NPLs to Gross Loans	Loan to Deposits
Bahrain	19.2	56.0	5.6	-
Kuwait	18.5	30.4	3.8	71.7
Oman	16.2	68.8	2.1	97.8
Qatar	16	96.8	1.9	105.9
Saudi Arabia	17.8	158.8	1.4	79.4
UAE	18.3	102.1	7.1	85.8
GCC average	17.7	85.5	3.6	88.1
Azerbaijan	18	1.0	4.5	187.7
Canada	13.7	16.5	0.6	122.2
Kazakhstan	16.8	71.6	20.4	103.5
Malaysia	14.5	30.1	1.8	81.0
Mexico	15.9	132.4	2.9	-
Norway	15.7	35.1	1.3	115.5
Peru	14.4	122.4	3.8	-
Russia	12.8	69.8	6.5	97.4
Non-GCC average	15.2	59.9	5.2	117.9

¹ Banks hold high levels of high-quality Tier I capital and delinquency periods for recognition of NPLs are conservative (Aljabrin et al, 2014). Additionally, the provisioning ratios for some countries may not be comparable if they exclude specific provisions.

Sources: Authorities data; Haver; IMF staff calculations
Note: Data is for 2014 or latest year available

D. Countercyclical Macroprudential Policies—International Experience

10. Macroprudential frameworks and policies vary across commodity exporting countries.

For illustrative purposes, the formal countercyclical macroprudential frameworks and policies in five selected emerging and advanced commodity exporting countries are explored using responses of country authorities (for Azerbaijan, Canada, Malaysia, Norway, and Peru) to the IMF's Global Macroprudential Policy Instruments Survey (2013) and updated from country sources. In these countries (Annex II), the countercyclical use of macroprudential policy instruments (MPIs) is well-defined, supported by early warning indicators and clear guidance for action. These developments are recent—four of the five countries started implementing MPIs in a countercyclical way only after the global financial crisis, while Malaysia started earlier. The differences in the policy frameworks and tools reflect the structure of the financial system and the policy makers' assessment of systemic risks. Some interesting aspects are:

⁶ See IMF Selected Issues Paper, "Assessing the Importance of Oil and Interest Rate Spillovers for Saudi Arabia."

- *Two commodity exporters are among the early adopters of the CCB.* In Norway and Peru, a framework for CCBs has been established. Norway's framework is closely aligned with the Basel III guidance and the CCB can range between 0 to 2.5 percent of risk-weighted assets. The framework specifies a role for four indicators—related to credit, asset prices, and wholesale funding in banks—and the judgment of policy makers to trigger an increase in the CCB. Market turbulence indicators and loss prospects for the banking sector are to be used to trigger a decrease in the CCB to ensure a timely policy response to emerging systemic risks. To minimize leakages, all domestic banks and foreign branches will be covered. The Ministry of Finance is responsible for making decisions related to the CCB but is required to consult with the central bank. In contrast, Peru's CCB framework uses results from an internal methodology to calibrate the level of the CCB, and the GDP growth rate as an indicator to trigger an increase as well as a decrease in the CCB. The supervisory authority of banks (SBS) is responsible for making decisions related to the CCB.
- *The LTV and DTI limits on the household sector are among the most popular MPIs.* Canada, Malaysia, and Norway use these tools to contain financial sector risks from household leverage. In Canada and Norway, the two tools are used together and can be mutually reinforcing – as house prices increase, LTV limits become less constraining but DTI limits become more binding. In Malaysia, LTV limits are implemented in a targeted way to the purchasers of multiple homes and luxury properties, and are supplemented with caps on the overall exposure of banks to the property sector and for the purchase of equities. In Canada and Malaysia, leakages to the nonbank sector and through extension of loan repayment periods are addressed by applying the measures to banks and nonbanks and introducing limits on loan repayment periods. In Norway, the measures are applied only to residential mortgages from banks.
- *Tools to limit corporate sector risks were relatively uncommon.* None of the five countries have implemented sectoral capital requirements or caps on exposures to the corporate sector. Only one country, Malaysia, has implemented LTV limits on commercial real estate (CRE).
- *Liquidity tools are being used countercyclically.* Liquidity indicators are being used to calibrate liquidity requirements in a countercyclical way in Azerbaijan and Canada. Peru, which was concerned with foreign currency exposures owing to volatile capital flows, has introduced high reserve requirements on foreign currency liabilities of banks. These reserve requirements have been eased recently with the impending normalization of U.S. monetary policy.

11. An important lesson from the international experience is that multiple early warning indicators can help assess the evolving nature of systemic risk and the need for tightening or relaxation of measures. The policy frameworks of the commodity exporters suggest a need for policy makers to remain vigilant about the evolving source of systemic risks. Early warning indicators can help signal when policy adjustments are appropriate, and support clear communication of policy intentions (IMF, 2014). When multiple indicators point to a build-up of risks, there is a stronger case for policy action. Over time, efforts to assess the reliability of signals provided by early warning indicators, and address data gaps (where they exist) can help improve the policy response.

12. Leakages need to be contained for policy to be effective. Leakages occur when the provision of credit migrates outside of the scope of application of the macroprudential tools. For instance, when MPAs are applied to domestic banks, their effectiveness can be reduced by the migration of credit activities and associated risks to non-banks, off-balance sheet vehicles and foreign financial institutions. Domestic leakages can be addressed by extending regulations to all financial products, including by non-bank financial institutions, and enforcing these through high standards for consolidated supervision (e.g. in Canada and Malaysia, DTI limits are supported by caps on loan repayment periods, LTV and DTI limits are extended to banks and nonbanks). Cross border leakages of capital tools may be addressed by reciprocity arrangements, or alternatively, greater host control over foreign branches (e.g. Norway). In this regard, economies with a larger nonbank sector or more open financial sector may find it challenging to implement macroprudential policies effectively. However, expanding the perimeter of macroprudential action can face legal and operational challenges, including the need for greater cooperation among supervisory agencies.

13. Preliminary evidence points to the effectiveness of macroprudential policies in reducing systemic risks during upswings, less so during downswings. Macroprudential policies are being increasingly used in emerging markets, especially since the global financial crisis. Based on the experience so far, some operational considerations with respect to the design and implementation of macroprudential policies are summarized in Annex III. Given that these policies have only recently been introduced, the evidence on their use and effectiveness is still preliminary. Some studies that have examined the effectiveness of macroprudential tools over the financial cycle have found them effective in reducing the buildup of systemic risks during booms, but less so during busts. A recent study by Cerutti et al (2015) finds evidence of asymmetric effects on the effectiveness of macroprudential policies between booms and busts. Similarly, Kuttner and Shim (2013) consider a number of macroprudential tools, and find that a tightening of the DTI ratio is associated with a significant deceleration in housing credit, and housing-related taxes are associated with a decline in house price growth. On the other hand, loosening of the DTI ratio has a comparable (but statistically insignificant) effect in the opposite direction. Somewhat stronger results for the LTV and DTI limits during downturns are found by McDonald (2015). As this literature points out, it is challenging to draw conclusions regarding the effectiveness of macroprudential policies during downturns as there are few instances of policy loosening and their effects can be difficult to isolate from those of other policies.

E. Policy Recommendations and Conclusions

14. The exposure of Saudi Arabia to volatile oil prices suggests a role for countercyclical macroprudential policies to mitigate systemic risks in the financial sector. Oil price shocks are a cause of feedback loops between asset prices, government spending, credit, and non-oil GDP. Fiscal policy remains the main policy tool to protect against fluctuations in oil prices and manage aggregate demand in a sustainable way. In this context, a more countercyclical fiscal policy could help dampen not only the economic but also the financial cycle. In addition, countercyclical macroprudential policies can be used to reduce the buildup of systemic risks in the financial sector

during oil price upswings, and to cushion against disruptions to financial services during oil price downswings.

15. SAMA has implemented a wide range of macroprudential instruments to build resilience in the banking sector, but some enhancements to the toolkit could be considered.

Banks have been encouraged to build capital buffers and provision for NPLs in a countercyclical way and reserve requirements were also adjusted during the global financial crisis to manage liquidity pressures on banks. As a result, the Saudi banking sector is well-capitalized and profitable and compares well with many other commodity exporting countries. Other instruments have been introduced to limit the build-up of risks, but these have not been adjusted over time. A framework for countercyclical buffers is being developed in line with Basel guidelines. However, countercyclical buffers are considered to be more effective in building resilience than in moderating credit cycles (IMF, 2014). Given the evidence of feedback loops from oil prices to equity prices, credit, and non-oil GDP, there may be scope to expand the countercyclical use of existing time-invariant macroprudential instruments. Additionally, sectoral concentration limits (e.g. on margin lending for the purchase of equities, or on the construction sector which may be more exposed to government spending) may prove useful to address emerging financial sector risks from specific sectors/activities in a more targeted way.

16. A well-defined macroprudential policy framework is needed to guide the countercyclical use of MPis in Saudi Arabia. In addition to measures to strengthen the macroprudential framework that are already underway at SAMA, a formal macroprudential framework would assign roles and responsibilities among SAMA, the Capital Markets Authority, and the Ministry of Finance to help strengthen macroprudential policy formulation and implementation within and across institutions. An assessment of the reliability of early warning indicators in signaling potential systemic stress would help identify triggers that would guide the countercyclical use of a broad set of macroprudential policies. The framework would provide clear guidance on how macroprudential policies will be implemented to maintain financial stability and manage systemic risks over the financial cycle.⁷ The framework can then guide decisions on when and how macroprudential policies can be tightened or eased to mitigate adverse feedback loops, while respecting microprudential norms to maintain confidence and an appropriate degree of resilience against future shocks. Policy makers will need to monitor a number of high-frequency and granular indicators closely to assess financial stress (see Annex III for a list of indicators that can be used for each tool). The decision to relax macroprudential policies will need to be based to a considerable extent on judgment drawing on market intelligence, supervisory assessments and stress tests.

⁷ For instance, the framework will need to identify the minimum regulatory capital requirements and set the countercyclical buffers in line with Basel III capital requirements. Regulatory minima will also need to be set for other tools that can be used countercyclically.

17. Microprudential norms should be set taking into consideration the structural risks from the lack of economic diversification and concentration risks. The vulnerability to the lack of economic diversification is accentuated by the high degree of interconnectedness in the corporate, financial, and public sectors (Aljabrin et al, 2014). Moreover, data gaps with respect to real estate prices imply that staff analysis does not capture an important channel for transmission of shocks to the financial sector.⁸ Regulatory minima and the assessment of the policy space should be calibrated to reflect these risks.

18. Only those tools should be relaxed where policy space is assessed to be available. The relaxation of MPIs will have to consider the source of systemic stress—if liquidity pressures are the source of banking sector stress, easing reserve requirements first would be appropriate. If this proves insufficient, the loan-to-deposit ratio can also be relaxed. If the stress is on asset quality leading to loan losses and declines in bank capital, dynamic provisioning ratios may be allowed to decline first to absorb losses. A relaxation of the CCB should be considered only after dynamic provisions have been used, to limit any adverse impact on investor confidence. Strong financial supervision will remain essential to ensure the adequacy of the remaining capital and liquidity buffers.⁹ If the buffers after release would be inadequate, banks should be required to raise capital and liquidity instead.

19. The macroprudential policy framework needs to contain potential leakages. DTI limits are currently applicable only to personal and consumer loans and exclude debt service on residential mortgages. An expansion in the scope of the DTI limits to include all debt service to be paid by an individual borrower (as is under consideration); and extending LTV limits to CRE loans (currently applied on residential mortgages) or other corporate loans secured by real estate as collateral could increase effectiveness of MPIs. In a similar vein, MPIs should be extended to nonbanks and foreign branches.

20. Addressing data gaps and improving coordination across regulators would strengthen the ability to assess systemic vulnerabilities in Saudi Arabia. Action is needed in several aspects. First, financial information is limited in a number of areas and poses an obstacle toward building an efficient macroprudential framework and identifying systemic risks as most of the tools and models commonly used to identify systemic risk require comprehensive and granular set of data.¹⁰ Second,

⁸ Real estate loans by banks are a fairly small share of total credit, although real estate has been used as collateral for corporate and consumer loans. Lending by finance and leasing companies has only recently been brought under the purview of SAMA supervision. To the extent that real estate lending has been previously conducted by the non-bank sector, there is limited data on these activities and risks may be associated.

⁹ Although the Saudi banking sector is assessed to be well-capitalized and profitable at the current juncture, supervisors will need to assess if policy space may be diminished by low risk-weights or adjustments to the computation of regulatory capital.

¹⁰ Some of the data gaps that need to be filled include: data on commercial and residential real estate prices, household balance sheets (distribution of equity and home ownership, household debt, LTV and DTI ratios), corporate balance sheets (e.g. debt and debt service coverage ratios including for non-listed firms), characteristics of
(continued)

the process of data compilation needs to incorporate both macro- and micro-prudential aspects, looking both at the big picture and risks at the micro level. Third, information sharing and policy coordination between different regulators is essential to prevent macroprudential policy gaps and leakages.

21. Macroprudential policies will need to remain adaptable over time as the financial sector deepens to support a growing economy. Many initiatives for financial deepening are likely to have financial stability implications. For instance, promoting SME financing may increase risk taking within the banking sector. Similarly, plans to open the capital market for foreign investment would increase vulnerabilities from capital flows. Over time, as the financial sector deepens, the macroprudential framework and toolkit would need to adapt to an evolving set of systemic risks.

bank loan portfolios (fixed versus variable interest rate loans, secured and unsecured loans etc.), and cross border exposures vis-à-vis non-BIS-reporting banks/countries.

Annex I. SAMA's Policy Toolkit for the Banking and Insurance Sectors

Banking Sector	
Instrument	Regulatory Requirement
Capital Adequacy Ratio	Basel requirement of a minimum of 8 percent
Provisioning	General: 1 percent of total loans Specific: Minimum of 100 percent of NPLs
Leverage Ratio	Deposits/(Capital + Reserves) \leq 15 times
Reserve Requirement	7 percent for Demand Deposits 4 percent for Time & Saving Deposits
Loan-To-Value (LTV)	Mortgage loans \leq 70 percent of home value
Debt Service – To – Income (DTI)	Monthly repayments \leq 33 percent of employed salary and 25 percent of retired pension
Loan-to-deposit (LTD) ratio	85 percent
Liquidity:	
• Statutory Liquidity Reserve	Liquid Assets/deposits \geq 20 percent
• LCR (Basel III)	100 percent by 2019 (already fulfilled)
• NSFR (Basel III)	100 percent by 2019 (already fulfilled)
Counterparty Exposure	Individual Exposure/total capital \leq 25 percent
Foreign Exposure	SAMA approval needed before foreign lending (a qualitative measure)

Insurance Sector	
Instrument	Regulatory Requirement
Solvency Margin	$\frac{\text{Admissible Assets}}{\text{Min Capital/GWP/Claims}} = 100 \text{ percent}$
Provisioning(Technical Reserves)	Specific Requirements for each type of reserve (See Insurance Implementing Regulation)
Statutory Deposit (at SAMA)	10 percent of Paid Capital (Subject to additional 5 percent based on company profile)
GWP-to-Capital ratio	$\text{GWP}/(\text{Paid Capital} + \text{Reserve}) \leq 10 \text{ times}$
Reinsurance	30 percent must be reinsured within the Kingdom Reinsurers must be rated at least BBB
Retained Insurance Premium	30 percent of total Insurance Premium (SAMA exemption may apply)
Foreign Exposure	SAMA approval before risk sharing with foreign companies 50 percent of Investment portfolio should be in Saudi Riyal $\text{Foreign investments}/\text{Total Investments} \leq 20 \text{ percent}$ Off-Balance sheet investments are not allowed
Other qualitative measures	SAMA approval for mergers and acquisition

Annex II. Countercyclical Use of Macroprudential Tools, 2013

	Azerbaijan	Canada	Malaysia	Norway	Peru
1 Capital tools					
1.1 Countercyclical buffers				Law passed in July 2013; range is 0-2.5 percent of RWAs; applied to domestic banks and foreign branches; calibrated with 4 indicators for tightening; being phased in from June 2015	Implemented in July 2011; size determined based on stress tests; calibrated using GDP growth rate
1.2 Leverage ratio		Introduced in 2010; minimum 8 percent; calibrated using credit indicators			
1.3 Dynamic provisioning requirements					Introduced in 2008; trigger based system, using GDP growth rate
2 Household sector tools					
2.1 Capital requirements			Higher risk weights on capital charges for housing loans and personal financing		
2.2 Loan-to-value ratio		Introduced in 2008; applies to new loans by banks and nonbanks; calibration based on performance of housing market.	Introduced in 1995; targeted limits for individuals with multiple housing loans; applied to new loans by banks and nonbanks; calibrated based on credit and asset prices.	Introduced in 2010; applies to new residential mortgages by banks; calibrated based on sectoral credit growth and asset prices.	
2.3 Debt-service-to-income ratio		Introduced in 2008; applies to new loans by banks and nonbanks; calibration based on performance of housing market; supported by limits on amortization periods.		Introduced in 2010; applies to new residential mortgages by banks	

Annex II. Countercyclical Use of Macroprudential Tools, 2013 (concluded)

	Azerbaijan	Canada	Malaysia	Norway	Peru
3.3	Loan-to-value ratio (on CRE)		Targeted limits for businesses; applied to new loans by banks and selected nonbanks, limits on amortization periods since July 2013.		
4	Liquidity Tools				
4.1	Liquidity buffers	Calibration based on assessment of liquidity indicators	Three definitions of liquidity buffers are applied to banks; calibration based on assessment of liquidity and market risk indicators		
4.2	Reserve requirements	Introduced in 2005; calibrated using credit indicators			Applied to outstanding stock and new liabilities; used to limit foreign currency exposures; adjusted based on market indicators and systemic risk measures
	Framework (mandate, responsibility, and coverage)	Mandate for financial stability rests with Central Bank; measures are applied to banks.	Authority and coverage varies by instrument between the Ministry of Finance and the Supervisory Authority, in coordination with the Central Bank and the Deposits Insurance Company.	Mandate for financial stability; authority rests with Central Bank; measures are applied to banks and selected nonbanks.	Mandate for financial stability; authority and coverage varies by instrument between Ministry of Finance, Central Bank, and Financial Supervisory Authority.
					Mandate for financial stability; responsibility for implementation is shared between Supervisory Authority and Central Bank. Measures are applied to banks and nonbanks except insurance companies and pension funds.

Source: IMF's Global Macroprudential Instruments Survey, includes macroprudential policies as reported by country authorities.
Note: This excludes macroprudential tools that are not used countercyclically to manage systemic risk.

Annex III. Issues in the Implementation of Macroprudential Policies

This Annex draws on the IMF's Staff Guidance Note on Macroprudential Policy—Detailed Guidance on Instruments, November 2014. It summarizes the main issues and operational considerations in implementing specific macroprudential tools.

Broad-Based (Capital) Tools

Countercyclical buffer (CCB): Basel III has introduced a framework for a time-varying capital buffer on top of the minimum capital requirement and another time-invariant buffer (the conservation buffer). The countercyclical buffer is expected to be phased in gradually from 2016 to 2019. The CCB aims to make banks more resilient against imbalances in credit markets and thereby enhances medium-term prospects of the economy—in good times when system-wide risks are growing, the regulators could impose the CCB which would help the banks to withstand losses in bad times.

Operational considerations:

- The Basel committee recommends that the CCB be set at a maximum of 2.5 percent of risk-weighted assets, although it can be set higher based on broader macroprudential considerations. Stress tests can help calibrate the appropriate size of the CCB to reflect both a capital shortfall in a stress scenario and extra capital needed to maintain investor confidence in a downturn.
- For foreign banks in host jurisdictions, the reciprocity principle under the Basel II framework requires home country supervisors to ensure that the banks they supervise apply the CCB on exposures in the host jurisdiction that has imposed the CCB. This reciprocity arrangement will apply as long as the buffer does not exceed 2.5 percent, above which reciprocity is voluntary or based on further bilateral or regional agreements between home and host country authorities.
- It may take time for banks to raise capital so the process of increasing the CCB should begin early in the financial cycle. Increases in the buffers should be preannounced for 12 months to give banks time to meet the additional requirements. At times of financial stress, reductions in the buffer could take effect immediately to help reduce the risk of a credit crunch.
- The BCBS suggests that triggers to tighten CCBs can be based on estimates of the credit gap (derived as the deviation of credit-to-GDP ratio from trend). Other early warning indicators (e.g. credit growth, deviation of real estate and equity prices from long term trends, measures of market volatility and spreads, debt service and leverage ratios, reliance on wholesale funding, current account balances) that reflect country-specific systemic risk can also be incorporated. Over time, performance of these indicators in identifying systemic risk will need to be monitored.

- Triggers to ease CCBs could be based on high-frequency market-based indicators of banking sector distress such as asset prices, credit spreads, and measures of market volatility in equity and foreign exchange markets.¹ Additional indicators could include growth rate and leverage on new loans, credit conditions, and increases in nonperforming loans. To ensure that banks use the released capital to absorb losses, dividend payments should be restricted when the CCB is released.

Dynamic loan loss provisioning requirements (DPR): help smooth provisioning costs over the financial cycle and insulate bank income and lending in bad times. This pool of provisions, set aside in good times, can be used to cover realized losses in bad times when specific provisions for impaired loans exceed the average specific provisions over the economic cycle.

Operational considerations:

- There are four main approaches to the DPR (i) through the cycle accumulation (formula-based approach) builds up general provisions in line with expected losses on new and existing loans, net of specific provisions on losses incurred during the period, (ii) trigger-based systems use thresholds of indicators to increase or release DPR buffers, (iii) loan by loan provisioning based on expected losses and probability of default data, and (iv) a hybrid approach combining (i) and (ii) with a trigger for allowing banks to access DPR reserves.
- The formula-based approach is the least data intensive DPR framework (e.g. Spain, Uruguay) and accumulates and releases DPR buffers automatically and gradually as actual loan losses vary over the cycle. On the other hand, trigger based systems require estimation of thresholds of indicators that would signal the release of the DPR, but can allow reserves to be saved for rapid deployment during periods of stress.
- A hybrid approach can be based on an accumulation formula but would add a trigger rule for release based on the same indicators identified for the release of the CCB. A bank would not be allowed to access its dynamic loan loss reserves unless indicators signal a downturn. As in the release of CCB, dividend payments should be restricted when DPRs are released.

Sectoral Tools

Household sector: vulnerabilities from excessive credit to the household sector and procyclical feedback between credit and asset prices can be addressed through sectoral capital requirements, loan-to-value (LTV) and debt-service-to-income (DTI) limits.^{2,3}

¹ Credit usually lags the business cycle, so the credit/GDP gap does not work well as an indicator for releasing the CCB.

² LTV limits cap the size of the loan relative to the appraised value of a property, while DTI limits cap the debt service as a share of borrower income.

Corporate sector: vulnerabilities from increases in corporate leverage, lending to commercial real estate (CRE) or from forex lending to the corporate sector can be addressed through sectoral capital requirements and exposure caps (e.g. higher risk weights for foreign currency credit, caps on growth of corporate credit and in foreign currency). To deal with risks from CRE lending, LTV limits can also be used.

Operational considerations:

- Capital requirements and risk weights build resilience by forcing lenders to hold extra capital against their exposures to a specific sector and can be calibrated using results of stress tests. Caps on credit growth slow the supply of credit, while LTV and DTI limits reduce demand. LTV and DTI limits reinforce each other and can be used in an interlocking way— as asset prices rise relative to income, LTV limits become less constraining but DTI limits become more binding.
- These tools can be differentiated between types of borrowers, across regions, and by currency and type of loans.⁴ There are no fixed thresholds for early warning indicators to suggest a tightening or relaxation. Tools can be calibrated to reflect country specific risks.
- Sectoral capital requirements are less distortionary and can be applied first on either the entire stock of loans or to new lending. If sectoral capital requirements are tightened on the entire stock of loans, they may require significant adjustment and will need to be announced well ahead of the planned enforcement date. LTV and DTI limits can be subsequently imposed on the flow of new loans, if capital requirements fail to slow the growth of credit.⁵ A cap on sectoral credit growth has little direct effect on the resilience of the banking system and is more distortive and could be implemented if other measures prove inadequate. Decisions to ease sectoral macroprudential policies can be sequenced in the same way as a tightening.⁶
- When several indicators signal elevated systemic risk, policy tightening should be gradual to overcome uncertainty over strength of economic transmission.⁷ Stepped up communication and supervisory guidance prior to introducing measures can reduce the burden on borrowers and lenders while strengthening the expectations channel. Loosening decisions may need to be taken more rapidly than tightening decisions.

³ Where supply constraints are an important driver of real estate price increases, macroprudential measures are likely to be of limited effectiveness. In such situations, measures to alleviate supply constraints are appropriate.

⁴ For example, they may be applied only to mortgages that are interest-only, in foreign currency, or on luxury and investment properties.

⁵ LTV limits are often applied in commercial and residential real estate markets, but can also be applied to other secured loans, such as car loans.

⁶ Defining minimum capital buffers and maximum LTV and DSTI ratios that are considered safe in a downturn is critical to ensure that microprudential norms are respected and financial stability is maintained.

⁷ Mixed signals from multiple indicators are not sufficient for action.

- For the household sector, indicators that could be used to assess a need for tightening include household loan growth and house price growth (jointly), to help prevent feedback loops between asset prices and credit.⁸ Other indicators could include mortgage loan growth, house price to income and house price to rent ratios, and the share of households in total credit in local and foreign currency. Further indicators may help a targeted policy response (e.g. house prices in different regions, average risk-weights on household loans and capital buffers above minimum, the average and distribution of LTV and DSTI ratios across various income groups, share of foreign currency denominated or interest-only loans).⁹
- Easing macroprudential policies on the household sector can also rely on similar indicators as used for tightening decisions. In addition, fast-moving indicators could include transaction volumes, spreads on household loans, and CDS spreads of financial institutions to help policy makers respond in a timely fashion.
- Corporate credit indicators that could be used to assess a need for tightening include the growth rate of corporate credit and the share of corporate credit in total credit in local and foreign currency (both stocks and flows). A range of additional indicators such as leverage on new and old loans, debt service ratio (debt service as a share of operating surplus), corporate credit/operating surplus (share and growth rate), corporate credit gap, and lending standards could also be considered.
- In addition to indicators used for tightening decisions, fast-moving indicators such as spikes in corporate CDS spreads can help policy makers respond to corporate sector stress in a timely fashion.

Liquidity Tools

A variety of liquidity tools are available to promote a more sound funding profile in banks. Liquidity buffer requirements (e.g. a liquid asset ratio) oblige banks to hold a certain amount of liquid assets as a share of all short-term funding. A liquidity coverage ratio (LCR) can help ensure that banks hold sufficient high quality liquid assets to fund net cash outflows over a 30 day period. A stable funding requirement ratio (e.g. Net Stable Funding Ratio (NSFR), loan-to-deposit (LTD) ratio, core funding ratio (CFR)) can help ensure that banks hold stable liabilities (e.g. deposits) to fund their relatively illiquid assets.¹⁰ Liquidity charges impose a levy on non-core funding and can be differentiated by currency and can be accumulated for the budget or a dedicated fund that is used to provide liquidity during times of stress. Reserve requirements can be applied on short-term liabilities and adjusted for financial stability purposes. In addition, constraints on open FX positions and on FX

⁸ LTV limits are often applied in mortgage markets, but can also be applied to other secured loans, such as car loans.

⁹ Where supply constraints are an important driver of real estate price increases, macroprudential measures are likely to be of limited effectiveness. In such situations, measures to alleviate supply constraints are appropriate.

¹⁰ International discussions on liquidity tools are ongoing as minimum standards for the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) are being negotiated under Basel III.

funding may be used as well as tools to manage risks in nonbank financial institutions. Liquidity tools can be designed to target risks by currency and maturity and tailored to reflect country circumstances.

Operational considerations:

- Tightening liquidity tools is not only likely to boost resilience to liquidity shocks, but is also likely to slow the growth of credit by making funding more costly during a financial cycle upswing. Given the limited experience with countercyclical use of liquidity tools, a gradual tightening is recommended. When tightening reserve requirements, the volume of open market operations may need to be adjusted to sterilize the impact on banking system liquidity and keep interbank rates close to the policy target.
- Indicators that can be used to assess a need for tightening include the LTD ratio and the CFR. In addition, indicators of general credit conditions (based on surveys, movements in interest rates, short-term capital inflows, gross open FX positions) are also useful to guide the use of liquidity tools to moderate (liquidity-driven) credit cycles. There are no fixed thresholds for the indicators to assess a need for tightening, and stress testing can be used to assess specific risks and calibrate the policy response. Sharp movements in the indicators could also signal a need for policy action.
- During times of liquidity stress, a relaxation of liquidity tools is appropriate and liquidity buffers should be released promptly. Authorities can allow temporary declines in liquidity buffers (reserve requirements, liquid asset ratio) without changing the formal requirements. If this proves insufficient, the stable funding ratio can be relaxed temporarily to prevent fire-sales of assets and abrupt deleveraging. In the event of extreme funding stress, central bank liquidity support should also be provided.
- Indicators that can be used to assess liquidity stress include increased usage of the central bank's overnight or emergency facilities, increases in unsecured interbank rate spreads, margins and haircuts on repo collateral, FX swap rates, bid-ask spreads in FX, and CDS-bond spreads.

Tools for the Nonbank Sector

Nonbanks are also a significant source of systemic liquidity risks. Data collection and basic oversight of nonbank institutions and markets are important first steps in addressing risks in this sector. Macroprudential measures can be extended to nonbank intermediaries. Leverage ratios, liquidity buffers and stable funding requirements, sectoral concentration limits, regulations on margin lending are some of the tools that can help manage systemic risks in the nonbank financial sector and ensure a level playing field.

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ENERGY PRICE REFORM IN SAUDI ARABIA¹

Saudi Arabia has low energy prices by global standards. This is a key reason behind the strong growth in domestic energy consumption. Low energy prices disproportionately benefit higher-income groups and energy-intensive industries in many countries. A comprehensive energy price reform plan is needed, which gradually phases out low energy prices and puts in place mitigating measures to protect the vulnerable sections of the population and helps industry adjust to the higher energy cost environment. Higher energy prices could help in retaining priority investment and social spending during a fiscal adjustment process over the medium term.

A. CALCULATING COST AND IMPACT OF LOW ENERGY PRICES

1. Despite large oil reserves in Saudi Arabia (75 years of proven reserves), the country faces some energy challenges. Domestic consumption of refined petroleum products and electricity is growing rapidly and if not contained this will eventually cut into export revenues. Low domestic energy prices also mean that potential fiscal revenue is being foregone. Overconsumption has environmental implications and implies fewer oil resources will be left for future generations. The increase in domestic demand for energy can be attributed to several factors such as rising residential, industrial, and commercial needs of a growing country, and the low regulated energy prices. International experience suggests that the distributional impact of low energy prices largely benefits higher-income groups.

Estimated Implied Energy Cost

2. Saudi Arabia, like many other oil exporting countries, provides energy products to the entire population at prices well below international levels (Table 1). Gasoline prices in Saudi Arabia were almost one sixth of the retail prices in the U.S. in 2014. Even after taking into account a 16 to 35 percent drop in international prices of energy products since 2014, the price gap ranges from 5 to 12 times across most energy products. Retail fuel prices in Saudi Arabia are the lowest in the region. The low domestic price of \$0.14 per liter for premium gasoline partly reflects the low cost of domestic oil production. The domestic price for natural gas, set at \$0.75 per mmbtu was 7.3 times below international

Table 1. Retail Prices of Gasoline and Diesel
(2014; in US\$ per liter)

	Gasoline	Diesel
Bahrain	0.27	0.27
Kuwait	0.22	0.19
Oman	0.31	0.38
Qatar	0.21	0.41
Saudi Arabia	0.14	0.06
UAE	0.47	0.64
GCC average	0.27	0.32
Algeria	0.23	0.14
Iraq	0.39	0.34
Iran	0.41	0.09
United States	0.90	1.0

Sources: Country authorities; and IMF staff estimates.

¹ Prepared by Malika Pant.

prices in 2014 (Henry hub). The low prices for natural gas benefit the electricity generating companies as well as the petrochemical sector, each consuming roughly half of the total supply. Electricity and water tariffs are also lower than in many GCC countries. The low tariffs may partly reflect the low cost of inputs (crude oil, diesel and natural gas), which are also priced much below international prices, but the operating revenues of the Saudi Electricity Company (SEC) may not be sufficient to meet the capital requirement for the rising demand for electricity in the country.

3. The cost of low energy prices is not explicit in the central government budget in Saudi Arabia, but the implicit cost is substantial. The effects of low prices for the domestic consumption of energy are borne by oil producing companies like ARAMCO, oil refineries, SEC, and other quasi-government entities, who provide energy products at low prices to either the producers or the end consumers. The implied cost of low petroleum products and natural gas prices, computed using the price gap between domestic and U.S. prices (the reference price used as a proxy for international prices) and the quantity consumed, is estimated at \$83 billion (11.1 percent of GDP) in 2014 (Table 2). Taking into account the drop in international energy prices since 2014, the implicit cost is estimated to fall to \$65.9 billion (10.2 percent of GDP). About 86 percent of this cost is accounted for by petroleum products, dominated by diesel (39.4 percent share) and gasoline (22.1 percent share). Natural gas accounts for another 14 percent of the total cost. The implicit cost for the electricity sector is estimated at \$11.4 billion or 1.5 percent of GDP when computed using a similar price gap methodology between the average tariffs in Saudi Arabia and the U.S. in 2014. Post-tax estimates, which also take into account externalities and potentially foregone taxes on energy products, are higher than the implicit energy cost (pre-tax) estimate for Saudi Arabia (IMF 2014).

4. The implicit cost, computed using various other reference prices, is also substantial. For example, raising domestic prices of only gasoline and diesel products to the average level in the GCC would yield about

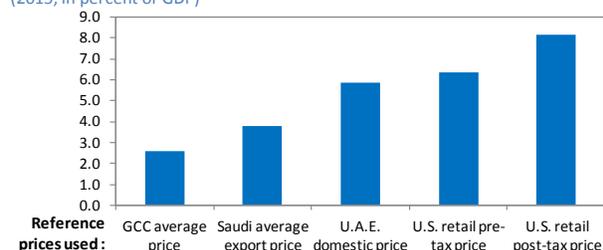
Table 2. Implied Energy Cost for Saudi Arabia in 2014

	Implied Cost 1/	
	US\$ mn	percent share
Gasoline (Premium 95)	n.a.	n.a.
Gasoline (Premium)	18,333	22.1%
Diesel (Gas oil)	32,736	39.4%
LPG		
Public	1,267	1.5%
Oil Industry	409	0.5%
Fuel Oil		
Public	16,823	20.3%
Oil Industry	1,693	2.0%
Total Petroleum products	71,261	85.9%
Natural Gas		
Public	9,617	11.6%
Oil Industry	2,109	2.5%
Total Natural gas	11,726	14.1%
Total oil and gas	82,987	100.0%
% of GDP	11.1%	
Electricity	11,348	
% of GDP	1.5%	

Sources: Country authorities, US department of Energy (EIA), Bloomberg and Fund staff calculations.

1/ Implied cost is measured by multiplying per unit implied cost with quantities consumed. Implied cost per unit is measured as the difference between the local price and the reference price. The reference price used is the U.S. market price adjusted for taxes.

Figure 1. Implicit Cost Estimates for Gasoline and Diesel: Under Different Reference Price Assumptions
(2015; in percent of GDP)



Sources: Country authorities; and IMF staff estimates.

2½ percent of GDP and raising them to the average export price of refined products from Saudi Arabia or to the price level in the U.A.E would yield an estimated 3.8 to 6 percent of GDP in additional revenues in 2015 (Figure 1).

Box 1. The Electricity Sector in Saudi Arabia

The Saudi Electricity Company (SEC) is the largest provider of electricity in Saudi Arabia and supplies energy to the residential (49 percent share), industrial (20 percent share), commercial (15 percent share), government (11 percent share) and other (5 percent share) consumers. SEC produces 77 percent of total energy supplied and purchases electricity from other corporations to

meet the rest of the 23 percent of domestic electricity demand. Other producers of electricity include the state-owned Saline Water Conversion Corporation (SWCC), which also provides desalinated water to Saudi Arabia and is the second largest single producer of electricity

(6 percent share), while several

privately-owned independent water and power plants account for the rest.

Electricity generation in Saudi Arabia is heavily dependent on hydrocarbons, with crude oil accounting for

28 percent of electricity production in 2013, diesel

(15 percent), heavy fuel oil (10 percent) and natural gas

providing the remaining 47 percent (Electricity and

Cogeneration Regulatory Authority (ECRA), 2013).

In 2010, following a study by ECRA, the average price of electricity sold to non-individual users was increased by over 20 percent, which increased revenues by SR 3.2 billion in 2011.

However, electricity tariffs in Saudi Arabia on average are still

more than three times lower than tariffs in the U.S. (see table).¹ Using this price gap to compute the implied cost of low electricity tariffs yields an estimate of \$11.4 billion or 1.5 percent of GDP in 2014. ECRA estimates the average cost of electricity production and transmission at SR 0.152 per kwh, reflecting the low cost of inputs,² which are priced substantial below international prices. Besides, the capital requirements of the electricity sector are substantial (see paragraph 13). The capital requirement to fund electricity expansion projects is estimated at about SR 526 billion over the next 5 years. Some of these are currently funded by the issuance of government loans and three sukuk issuances (valued at SR 68.6 billion or \$18 billion by end 2014).

Electricity tariffs in Saudi Arabia in 2014

	Average monthly Tariffs		Annual Electricity Consumption	
	SAR per kwh	USD per kwh	million kwh	US\$ million
Residential	0.16	0.04	135.96	5.6
Agriculture	0.09	0.02	42.852	1.0
Private hospitals and schools	0.12	0.03	30.012	1.0
Commercial	0.19	0.05	51.504	2.6
Government	0.26	0.07	4.68	0.3
Industrial	0.14	0.04	9.552	0.3
Average -Saudi Arabia	0.14	0.04	274.56	10.8
Average - U.S.		0.13		

Sources: Country authorities, US department of energy (EIA) and IMF staff calculations.

Fuel Prices paid by Electricity Producers in 2013 in US\$ per million BTU

Fuel Type	in Saudi Arabia	Internationally
	in USD per million BTU	
Heavy fuel oil	0.43	15.43
Gas	0.75	9.04
Diesel	0.67	21.67
Crude oil	0.73	19.26

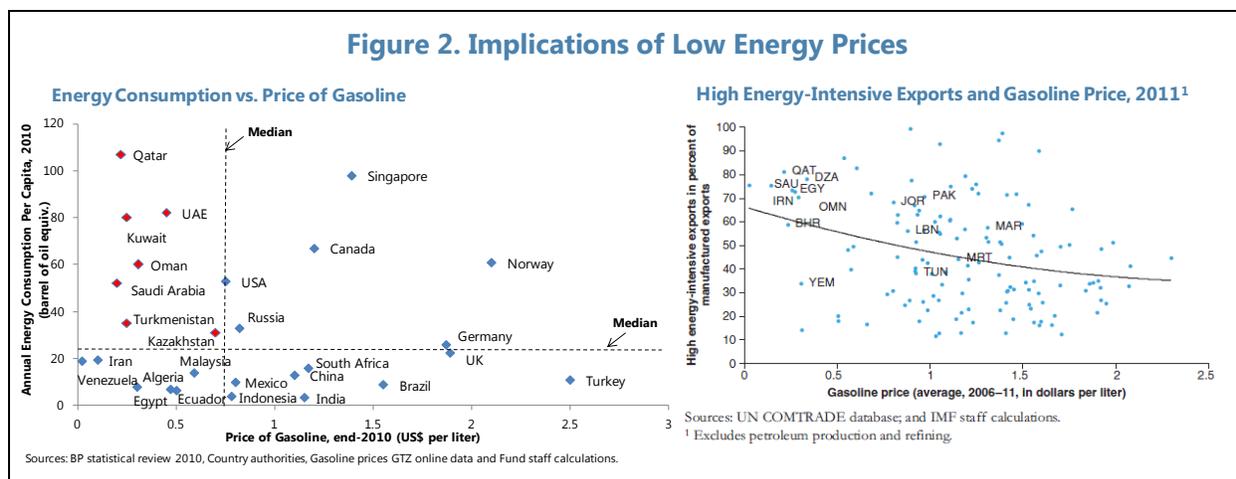
Sources: Saudi Arabia Electricity and Cogeneration Regulatory Authority (ECRA).

¹ Saudi has a tiered rate structure for electricity tariffs, differentiated across users (residential, commercial and other users), ranging from SR 0.05 per kwh to SR 0.26 per kwh, increasing with the volume of electricity consumed. Besides, SEC levies an additional monthly charge ranging from SR 0.1 to SR 0.3 per kwh, (averages to SR 0.2 / \$ 0.05 per kwh).

² Electricity generation in Saudi Arabia in 2013 used 47 percent natural gas priced at \$0.75 mmbtu, 31 percent crude oil priced at \$0.73, 7 percent heavy fuel oil and 22 percent diesel as inputs, which are available to producers at artificially low prices.

Growing energy consumption

5. **Per capita energy consumption in Saudi Arabia is among the highest in the world, promoted by low domestic energy prices** (Figure 2, left panel). Low energy prices have also promoted energy-intensive industries, specifically petrochemicals and the growing aluminum smelting industry, which significantly contributed to high energy intensity (Figure 2, right panel). The elasticity of energy consumption to growth over the period 1980–2011 was estimated to be higher for oil exporters at 1.3 compared to 1.1 for the MENA region (IMF 2014).



6. **Domestic consumption of refined oil in Saudi Arabia has been rising, reaching 2.5 mbd in 2014 and constituting about 19 percent of total crude oil production.²** Oil consumption has grown at an average annual rate of 6.3 percent since 2011, in line with the growth in real non-oil GDP during this period. In the absence of price related or other reforms to curb energy consumption, if oil consumption continues to grow at the annual average rate of 6.3 percent, the additional domestic demand for refined oil would completely crowd out the current refined exports of 1 mbd by 2022. Also, by 2042, all of the total oil exports of 8.1 mbd in 2014 would be required to meet domestic oil needs. Similarly, consumption of natural gas grew by an average rate of 5 percent between 2011 and 2014.³

² Refined oil consumption of 2.5 mbd in 2014 includes 0.04 mbd of LPG, 1.9 mbd of other refined oil products and 0.6 mbd of crude oil consumed as input by electricity and water companies as well as by cement, petrochemical companies among others.

³ Saudi Arabia produced about 1.95 million barrels of oil equivalent per day of natural gas in 2014, all of which was consumed domestically.

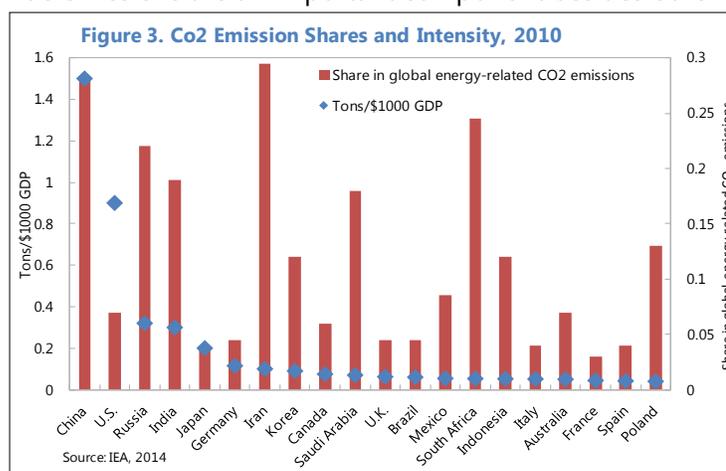
Table 3. Saudi Arabia: Trends in Oil Consumption and Exports
(In percent change)

	2011	2012	2013	2014	avg. 2011-14
Oil consumption	5.8	7.0	5.6	6.8	6.3
Oil exports	6.9	4.0	-0.9	-2.7	1.8
Crude oil exports	8.6	5.0	-0.1	-5.5	2.0
Refined oil products exports	-5.2	-4.0	-8.2	24.5	1.8
Real non-oil GDP	8.1	5.5	6.4	5.1	6.3

Sources: Country authorities.

7. Electricity consumption has increased substantially since 2010. Industrial and commercial usage increased cumulatively by 32 percent and 41 percent respectively between 2010 and 2014. The number of residential customers increased by over 50 percent during this period. Vast distances between the main population centers and industrial areas and climatic factors are a source of high energy demand in the transportation sector and for the use of electricity with very high seasonal demand. Water desalination plants are also highly energy intensive, while water tariffs are not cost reflective encouraging very high per capita consumption of water. According to IEA, the per capita consumption of water is 235 liters per day, which is 91 percent higher than the international average (according to a 2012 report by SWCC). Some of these factors could remain a constant source of energy demand in Saudi Arabia.

8. The low retail price of fossil fuels encourages overconsumption of energy and leads to environmental distortions. Carbon dioxide emissions are an important component besides other externalities from emission of local pollutants, traffic congestion and accidents. In Saudi Arabia, carbon dioxide emissions are recorded at three times the world average of 5 metric tons (IMF, 2014). The adjacent chart shows the CO₂ intensity of Saudi Arabia, measured in tons per \$1,000 of GDP, along with the other top twenty CO₂ emitting countries. Saudi Arabia has one of the highest CO₂ intensities among this group with CO₂ intensity of around 1.0.⁴

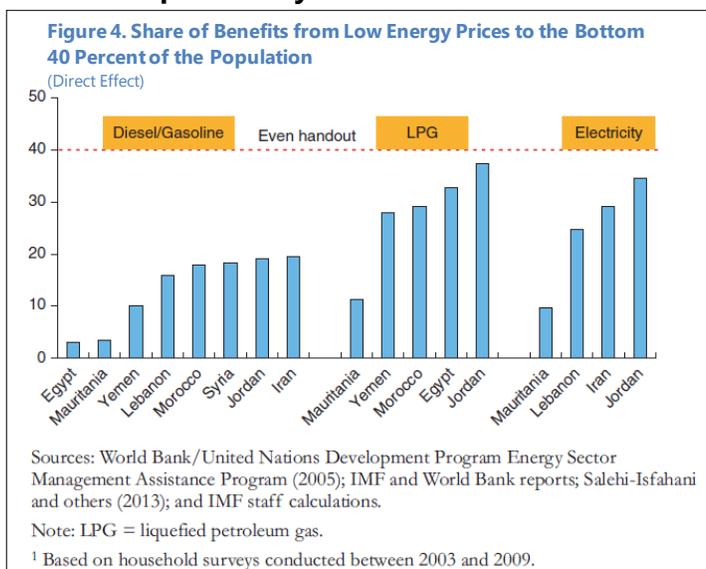


⁴ "How Much Carbon Pricing is in Countries' Own Interests? The Critical Role of Co-Benefits", Ian Parry, Chandara Veung, and Dirk Heine, IMF working Paper 2014.

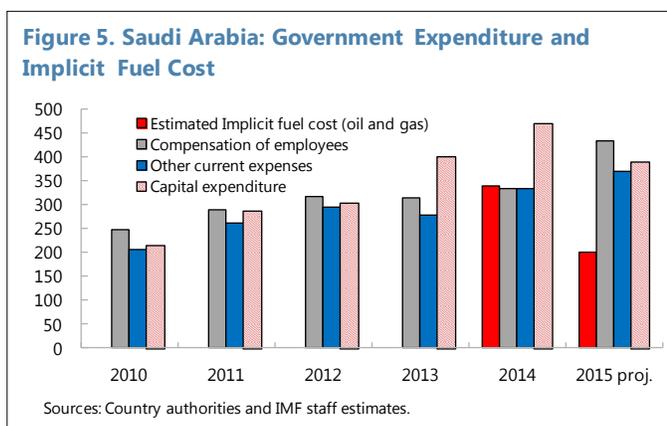
9. Besides excessive energy consumption, low domestic energy prices also create opportunities for smuggling and black market activities. If domestic prices are substantially lower than those in neighboring countries, there are strong incentives to smuggle products to higher-priced destinations. Fuel smuggling is a widespread problem in many regions around the world.

10. International experience shows that generalized low energy prices disproportionately benefit richer segments of the population and are not particularly effective at redistribution.

According to a survey conducted by the World Bank, the poorest quintile in Egypt, Jordan, Mauritania, Morocco, and Yemen receive only about 1–7 percent of total benefits from low diesel prices. In Egypt, the poorest 40 percent of the population received only 3 percent of the benefit from low gasoline prices, and 7 percent and 10 percent from low natural gas and diesel prices respectively. In Jordan, low energy price related benefits received by the richest quintile were about 20 percentage points higher than those received by the poorest quintile. The leakage of benefits from low prices to rich households is most pronounced in the cases of low gasoline and diesel prices, where the richest quintile benefit nearly 6½ (12) times more from low gasoline (diesel) prices than the poorest quintile (IMF 2014).



11. For Saudi Arabia, the 2013 household expenditure and income survey does not provide sufficient information to compute how low energy prices benefit different income groups. However, based on the survey, households with above average spending in Saudi Arabia spend between 10 and 13 percent of their total expenses on transport, compared to 1 to 7 percent among the low and medium spending households. This suggests that the incidence of transport fuel prices (gasoline) would likely be lower for the low income segment. On the other hand, a much larger share of utilities such as water, gas and electricity are consumed by the low and medium spending households than households with above average expenses, suggesting that raising electricity and water tariffs for the high income groups could be considered.



12. Reforms to reduce the high implicit cost of low energy prices would allow retaining priority spending during the fiscal adjustment process. Energy price reform could increase government revenues or reduce the support it provides to entities such as the electricity company. The implicit cost of low energy prices is also higher than the fiscal expenditure on either education or health and the additional revenues could be used to protect priority investments and social spending.

B. CURRENT ENERGY INITIATIVES IN SAUDI ARABIA

Expanding energy supply and refining capacity

13. Saudi Arabia plans to increase its domestic supply of energy by expanding its oil refining capacity. Three new refineries in Satorp, Yasref and Jazan (with 0.4 mbd capacity each) are being developed as part of Aramco's strategy to expand its refining capacity by 57 percent over the medium term. Satorp is fully operational and contributed to the 25 percent increase in refined oil exports in 2014. Yasref is expected to start refining by 2015Q4, while the Jazan refinery is expected to be functional by 2017. Besides meeting rising domestic demand, increased refining capacity will also boost the share of refined exports in total oil exports.

14. Saudi Arabia also has a large expansion plan for electricity generation capacity largely through renewable sources. As reported by SEC in 2013, renewable sources are not yet developed as a source of electricity. However, the growing need for electricity in the country has increased the domestic consumption of fossil fuel for power generation, and has prompted Saudi Arabia to explore renewable sources. The King Abdullah City for Atomic and Renewable Energy (K.A.CARE) is aiming to ensure that half of the electricity generated in Saudi Arabia comes from renewable sources by 2032, when forecast electricity demand growth will necessitate power generation capacity to increase to 120 gigawatts (GW) by 2032 (from 58 GW in 2013). According to a report by Brookings Institution, about 70 percent of the additional capacity is expected to be solar power and 30 percent nuclear power. Besides, newer technologies are expected to use natural gas as the primary input for electricity generation and production efficiency is targeted to increase to international levels over the next 7 years.

Energy Efficiency initiatives

15. Several initiatives are underway to improve efficiency in energy consumption. Saudi Arabia established the Saudi Energy Efficiency Center (SEEC) in 2010, which along with the Ministry of Water and Electricity and SEC is focusing on reducing energy consumption through audits, load management, regulation, and building awareness among users. An energy efficiency program was launched in 2012 with energy conservation targets with a primary focus on buildings, transportation, and industry sectors, while the SEEC, built on the former National Energy Efficiency Program (NEEP) in 2002, has set targets to reduce the country's energy intensity by 2030 and bring energy intensity in line with G7 countries. Regulations for building codes and appliance energy efficiency standards, along with targets in some industries to maintain efficiency standards, are being implemented to contain excessive consumption (Brookings, 2014).

16. Cross country experiences on successfully implementing measures to improve efficiency in household, commercial and industrial use of energy could provide useful comparisons to current initiatives in Saudi Arabia. The American Council for an Energy-Efficient Economy (ACEEE) compare policies and quantifiable performance across the world's 16 largest economies covering about 71 percent of global electricity consumption and ranks them in their scorecard. Similar reports from other international organizations have analyzed energy efficiency measures in a cross country context and provide useful recommendations. However, the unique social, cultural and geographic conditions in Saudi Arabia need to be considered while evaluating energy efficiency solutions for the country. According to a report by the Brookings Institution, low energy prices are considered one of the biggest obstacles to investments in efficiency, while non-market obstacles such as institutional barriers, lack of information about savings, and challenges in aggregating finance for small-scale technologies also create energy efficiency gaps in many cases.⁵

17. The development of public transportation systems is an important element of the authorities' efforts to improve energy efficiency. These will provide alternate modes of transport, and reduce the impact of fuel price increases on the population. The authorities have embarked on several large scale transportation projects in the country including the ongoing rail metro project in Riyadh which is expected to be completed by 2018. Similarly the high speed rail project connecting Mecca, Medina and Jeddah and the North-South railroad project are also expected to be completed by 2017 and 2018. A metro rail project in Jeddah and several bus projects across the country are being planned between 2015 and 2024.

18. Low domestic prices for petroleum products, natural gas and electricity tariffs create barriers to energy efficiency measures and could lower the attractiveness of alternative sources of energy. The cost-benefit calculations of both investors and consumers of energy are skewed by the low prevailing price of energy products. While energy efficiency initiatives would complement energy price reform in reducing inefficiencies, they may not help achieve a substantial slowing in consumption in the absence of a price reform. Delays in reforming energy prices could also reduce the effectiveness and implementation rate of some of the efficiency measures. A study based on 29 advanced and 37 non-advanced countries by Charap and others (2013) found a long-term price elasticity of energy demand between -0.3 and -0.5, which suggests that the responsiveness of energy consumption is quite strong to changes in energy prices, and that countries can reap significant long-term benefits from energy price reform. Their study also indicates that the loss of consumer welfare as a result of price reform is likely to be larger in the short term than in the long term, suggesting the need for either a gradual approach to energy price reform or for more generous safety nets in the short term.

⁵ "Low-carbon energy transitions in Qatar and the Gulf Cooperation Council region", Brookings Institution, February 2014.

C. CROSS COUNTRY EXPERIENCE WITH ENERGY PRICE REFORM

19. In the MENA region, energy price reforms have started, albeit at a varying pace in several countries. Many GCC countries have started increasing some energy prices and mostly for a small section of users. UAE and Qatar have increased gasoline prices; Bahrain and Saudi Arabia have increased electricity tariffs for industries; Kuwait has increased diesel and kerosene prices and is studying a proposal to increase electricity prices; and more recently Oman has doubled the industrial price for natural gas. However, the pace and magnitude of energy price reform in the GCC has been slow. Among other energy exporters in the region, Iran and Yemen have initiated energy price reforms. Many oil importers in the region, namely Egypt, Jordan, Mauritania, Morocco, Sudan, and Tunisia, have also initiated reforms over the last decade. Among energy exporting countries outside the MENA region, Malaysia, Nigeria, Indonesia have initiated energy price reforms.

Table 4. Energy Price Reform in the GCC

Recent reforms	
Bahrain	Gas price for old industrial costumers was increased 50 percent starting in January 2012, from \$1.50 to \$2.25 per mmbtu, while the price for new industrial customers remained at \$2.50 per mmbtu (prices for new customers were increased from \$1.30 to \$2.50 In April 2010). Starting in March 2015 the gas price for industrial users was unified at \$2.50 mmbtu. Also the authorities announced annual increases of \$0.25 per mmbtu in the gas price for industrial user starting in April 1, 2015 until the price reaches \$4.0 per mmbtu by April 2021. In March 2015 the authorities increased the fuel price in marine stations. Tariffs for electricity and water for non-domestic use were also raised (in October 2013).
Kuwait	A study on the impact of a differentiated electricity and water tariff structure was completed in 2014. Subsidies on diesel have been discontinued.
Oman	An energy sector study is ongoing, with a view to gradually reducing the overall fuel subsidy. In January 2015, the industrial price for natural gas has doubled.
Qatar	Qatar raised the pump prices of gasoline by 25 percent and of diesel by 30 percent in January 2011. Diesel prices were again raised in May 2014, by 50 percent.
Saudi Arabia	Saudi Arabia increased the average price of electricity sold to nonindividual users by over 20 percent on July 1, 2010.
United Arab Emirates	UAE increased gasoline prices in 2010 to the highest level in the GCC. Abu Dhabi is developing a comprehensive electricity and water consumption strategy, which led to an increase in tariffs in January 2015 (by 170 percent for water and 40 percent for electricity). Dubai raised water and electricity tariffs by 15 percent in early 2011.

Sources: Country authorities.

20. Energy price reform strategies implemented successfully by countries have been identified through various cross country studies by the IMF.⁶ The focus of these strategies was to put in place a comprehensive reform plan, which gradually raised energy prices and implement the necessary mitigating measures to protect the vulnerable sections of the population. Importantly, a well-designed communication strategy is crucial to gain popular support and buy-in of the middle

⁶ "Case Studies on Energy Subsidies Reforms: Lessons and Implications", International Monetary Fund, January 2013. "Subsidy Reform in the Middle East and North Africa: Recent Progress and Challenges Ahead", International Monetary Fund, 2014.

class. Cash transfers and other targeted mitigating measures may need to be implemented almost simultaneously to manage the social impact of price reform. International experience also shows that the absence of some of these strategies is a key reason for the limited success in some countries.

21. Successful energy price reforms are usually underpinned by the following six elements:

- **A comprehensive energy sector reform plan:** Such a plan should be drawn up in consultation with stakeholders and include clear long-term objectives and an assessment of the potential political barriers to the energy price reform and the impact of the reform.

For example, in Iran, the 2010 fuel price reform incorporated clear objectives, compensating measures, and a timetable for reform, preceded by an extensive public relations campaign. The public information campaign emphasized that the main objective of the reform was to replace the benefit of low energy prices with cash transfers to reduce incentives for excessive energy consumption and smuggling. Bank accounts were opened for most citizens prior to the reform and compensating cash transfers deposited into these accounts preceding the implementation of price increases. Similarly, a clear medium-term reform strategy backed by careful planning was also a major factor behind the successful electricity price liberalization reforms in the Philippines and Turkey. In Ghana, in 2005, the government commissioned an independent poverty and social impact analysis to assess the winners and losers from low fuel prices and their removal. This was an important foundation for persuasively communicating the necessity for reform and for designing policies to reduce the impact of higher fuel prices on the poor.

- **A comprehensive communication strategy:** A well-planned communication campaign is essential to help generate broad political and public support, and should be undertaken throughout the reform process. The communication campaign should inform the public of the cost of current policies and the benefits of the reform, including the budgetary savings generated to finance high-priority spending on education, health care, infrastructure, and social protection. Another key component of a successful communications strategy involves strengthening transparency in reporting the costs of low energy prices in the budget.

Information campaigns have underpinned the success of a number of countries, including fuel price reforms in Ghana, Iran, Namibia, and the Philippines, and electricity price reforms in Armenia and Uganda. For example, in the case of the Philippines, a public communication campaign began at an early stage and included a nationwide road-show to inform the public of the problems associated with low petroleum prices.

- **Appropriately phased and sequenced price increases.** Phasing in price increases and sequencing them differently across energy products may be preferable. Too sharp an increase in energy prices can generate intense opposition to reform, especially where there has not been sufficient communication or mitigating measures. A phased strategy will allow households and enterprises to adjust and give the government time to develop social safety nets.

For example, fuel prices in Morocco were raised gradually from 2012 to 2014 and the government increased the price of products at different rates and implemented a partial indexation mechanism for certain petroleum products and gradually eliminated low prices on gasoline and industrial fuel after two years. In Jordan, from 2012 onwards, gasoline and diesel prices and electricity tariffs increased gradually over two years and an automatic gasoline price formula has been adopted.

- **Targeted mitigating measures.** Well-targeted measures to mitigate the impact of energy price increases on the poor are critical for building public support for reforms. The targeting could be through higher prices for energy products that are used by the better off or through transfers. Targeted cash transfers or vouchers are the preferred approach for providing compensation. When cash transfers are not feasible because of limited administrative capacity, other initiatives, such as public works programs, can be expanded while capacity is developed. It is crucial that those who are hardest hit by the elimination of low energy prices be compensated from the beginning through more targeted social protection.
 - *Improving Targeting:* In several countries, including Morocco and Egypt, higher octane fuel was set at a higher price than diesel fuel used in public transport. Similarly, Jordan and Egypt provide cheap electricity to households for consumption up to a certain threshold. In Iran, the electronic card system introduced in June 2007 for gasoline rationing and quotas also provided a de facto multi-tier energy pricing structure for gasoline.
 - *Cash transfers:* In Jordan, the recurrent cash assistance program provides cash transfers to the beneficiaries depending on their income. The poverty alleviation program in Yemen also facilitated cash transfers to mitigate the impact of fuel price reforms. Iran deposited cash transfers in new bank accounts for households financed by the revenue from price increases. In Indonesia, several compensating measures have been introduced or expanded like the unconditional cash transfer payment and health insurance for the poor households, as well as some recently introduced programs which cover education, financial assistance, and healthcare support implemented with card technologies. Similarly, Morocco and Mauritania also introduced cash transfer programs targeting the vulnerable households.
 - *Other mitigating measures for households:* In Tunisia, additional programs introduced a new electricity tariff to protect low consuming households, a new social housing program, and increased income tax deduction for the poor households, among others. Morocco is also gradually strengthening existing programs to expand their coverage into social spending and targeting to vulnerable groups.
 - *Other mitigating measures for industries/ productive sectors:* In Jordan, to reduce dependence on energy imports, especially for energy intensive sectors, other energy sources with lower generation costs are being developed. In Iran, some of the revenue from the end-2010 price increases was to be set aside to provide support for enterprise restructuring and for efforts to reduce energy intensity.

- **Depoliticized price setting.** Successful and durable reforms require a depoliticized and rules-based mechanism for setting energy prices which can help reduce the chances of reform reversal. Adoption of an automatic fuel pricing mechanism is not in itself a solution for achieving sustained energy price reform, but should be part of a broader reform strategy (see Box 2). As seen in many country cases, energy prices are gradually raised and eventually an automatic mechanism is adopted to liberalize prices. In general, the responsibility for implementing an automatic pricing mechanism can be given to an independent body to help shield it from political pressures. Over the longer term, reforms for petroleum products should aim to fully liberalize pricing.
- **Improved efficiency of state-owned energy producers.** Energy producers often receive substantial budgetary resources to compensate for inefficiencies in production and revenue collection. Strengthening the financial position and operational performance of these enterprises can reduce the need for budget transfers. To address operational inefficiencies, many countries have permitted private companies for electricity generation and distribution. Improved demand management (by charging higher prices during peak periods) has proven effective in shifting demand to periods where marginal costs of provision are lower. Revenue-enhancing measures like improved collection and metering could be initiated with large customers and then gradually extend to medium and smaller ones. (IMF 2013a)

Box 2. Automatic Pricing Mechanism¹

Under such a pricing mechanism, international price fluctuations are passed through to the consumer using an explicit fuel price formula. Retail fuel prices are then changed at pre-specified regular intervals (e.g., weekly, bi-weekly, or monthly) to fully reflect changes in international prices.

This may be accompanied by some price smoothing rules to avoid excessive volatility in domestic prices in the short term. A number of smoothing mechanisms are possible, including price band and moving average mechanisms. The price band mechanism sets the maximum limit on the magnitude of retail price changes, while the moving average mechanism base retail price adjustment on changes in the history of international prices (preferably over a longer period for smoothing).

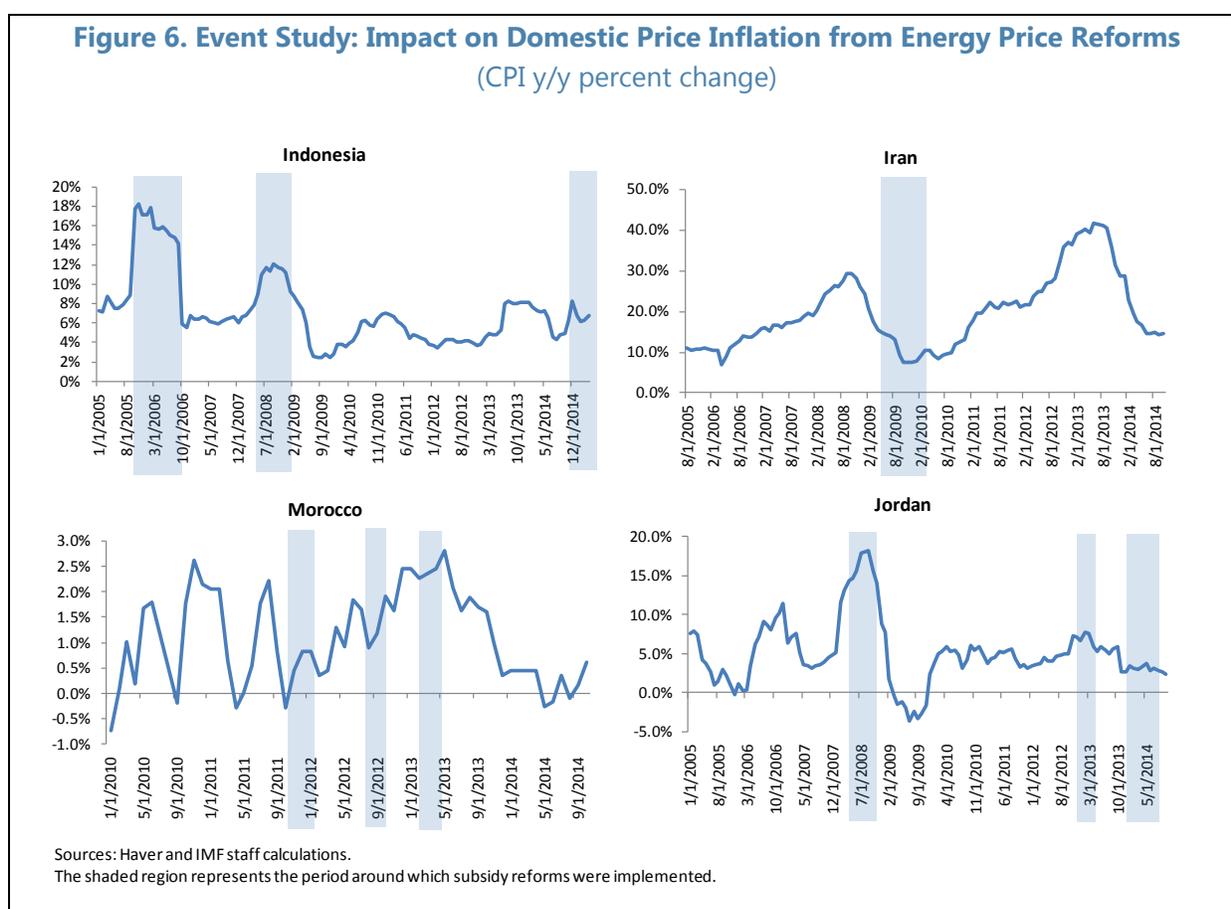
The adoption of an automatic price adjustment mechanism is intended to achieve a number of objectives. Implementing an automatic fuel price mechanism coupled with smoothing features would help reduce price volatility. Allowing for a large one-off increase in domestic energy prices or an ad-hoc approach could create political pressures that often result in long periods of fixed prices, and tensions between the government and fuel suppliers.

Examples of countries that have adopted automatic price mechanism: Jordan resumed a monthly fuel price adjustment mechanism in January 2013; Tunisia increased fuel prices on an ad hoc basis in 2012–13 and re-introduced an automatic price formula for gasoline in January 2014 to allow for future convergence to international prices over time; Mauritania adopted a new automatic diesel price formula in May 2012; Morocco started implementation of a partial indexation mechanism for certain petroleum products in September 2013, eliminated regulating gasoline and industrial fuel prices in January 2014, and introduced bimonthly reviews of these prices; and Cote d'Ivoire, which used to have fixed prices for fuel products, adopted an automatic pricing mechanism with smoothing in 2013.

¹Based on the Technical Notes and Manual on "Automatic Fuel pricing mechanism with Price Smoothing: Design, Implementation and Fiscal Implications", December 2012.

D. MACROECONOMIC IMPACT OF ENERGY PRICE REFORM

22. Cross country experiences show that the impact of energy price increases on inflation could be limited if the reform is well planned and gradual. Experiences in Morocco and Jordan suggest that persistent inflation is unlikely if price increases are gradual and well planned (Figure 6). Similarly, in Indonesia, price reforms in 2005 and 2008 caused short lived inflationary pressures which subsided within a few months. A new round of energy price reforms came into effect in Indonesia since January 2015 with no substantial pickup in inflation. In the case of Iran, policy measures were taken several months before the launch of the energy price reform in December 2010. These included a comprehensive communication campaign to create awareness about the planned safety nets, administrative policies to stabilize prices, among others. These efforts helped keep domestic inflation low for the initial months.

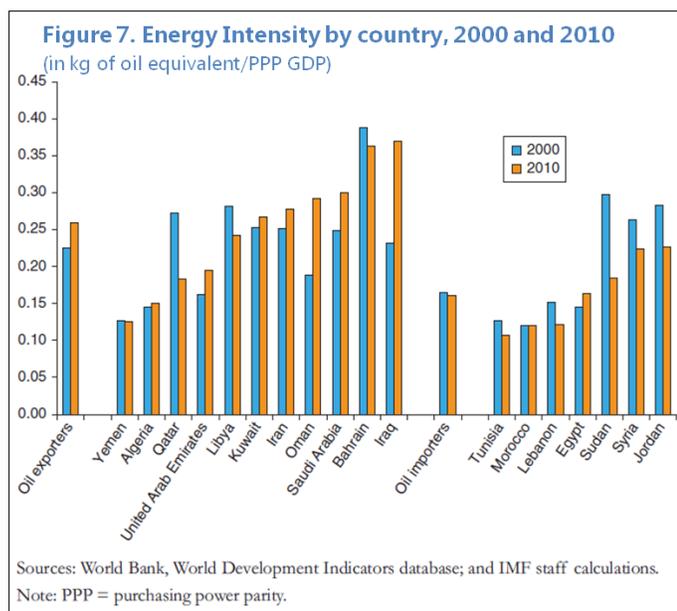


23. In Saudi Arabia, the impact on inflation of gradual energy price increases could be limited for several reasons. Energy related products—utilities (water, gas, electricity) and transport fuels— together constitute about 3.7 percent of the total CPI basket. The impact of the first-round increase in gasoline and diesel prices could be bigger on the middle and high income groups in Saudi Arabia with a bigger share of transport fuel expenses than others. The impact of rising

transport costs could be partly mitigated by the development of the public transport system. However, the middle and low income households in Saudi Arabia would be more impacted by increases in utilities prices, such as cooking gas, electricity and water. The price dynamics will also be affected by the second-round impact on the non-fuel components of CPI, which depends on expectations of future inflation (IMF 2014). Since the prices of food and many other commodities in the consumer basket in Saudi Arabia are imported, some of the impact of fuel price hike could be restricted. Detailed information on the consumption basket across income groups is needed to estimate the full incidence impact on inflation.

24. Since some industries in Saudi Arabia are energy intensive (plastics, petrochemical and aluminum), their production costs would increase due to higher energy prices and their competitive advantages will decline and potentially slow export growth.

However, improving the economy's competitiveness and business climate could help the economy adapt to higher energy prices over time, including the ongoing measures to support energy efficiency in Saudi Arabia (paragraph 15). Higher energy prices would create incentives for industries to pursue strategies to minimize energy costs, making them more efficient, and strengthen incentives for research and development in energy-saving and alternative technologies. Nonetheless, short-term adjustment costs may be large, and temporary measures can be introduced to help mitigate these costs.



E. CONCLUSIONS/KEY TAKEAWAYS FOR SAUDI ARABIA

25. The costs of low energy prices in Saudi Arabia, while not immediately obvious, are substantial. While businesses and consumers benefit from low energy prices, the costs include the rapid growth in consumption of energy products, potential fiscal revenues forgone, and a distribution of the wealth that likely disproportionately benefits the better off. A gradual increase in energy prices could reduce these costs. A reduction in the high implicit cost of low energy prices would also allow retaining priority investment and social spending during the fiscal adjustment process. Additional gains from current initiatives to increase energy supply and improve energy efficiency could also be achieved by raising domestic energy prices.

26. Saudi Arabia could draw from the energy price reform strategies implemented successfully by other countries. These experiences suggest that Saudi Arabia should develop a comprehensive energy price reform plan with clear long-term objectives and a detailed assessment of the impact of the reform on households as well as the productive sector. In addition to the current substantial efforts that are being made to increase energy efficiency, the reform plan should gradually phase out low energy prices and put in place mitigating measures to protect the vulnerable sections of the population and help industry adjust to the higher energy cost environment. Importantly, a well-designed communication strategy is needed. This should include the authorities calculating and publishing the cost of low energy prices, discussing the benefits of raising domestic prices, and announcing mitigating measures for targeted households and industries. Cash transfers and other targeted mitigating measures may need to be implemented almost simultaneously. The availability of public transportation systems, which the authorities are developing, is expected to reduce the impact of fuel price increases on the transportation costs of the population.

27. The availability of detailed household level data on the consumption basket across income levels will be essential to conduct a thorough analysis on the impact of increase in domestic prices on the low and middle income groups. A detailed breakdown of the consumption basket would also facilitate planning for cash transfers and other mitigating measures needed to protect the most vulnerable sections of the population, as part of a comprehensive reform strategy.

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MACROECONOMIC IMPLICATIONS OF LABOR REFORMS IN SAUDI ARABIA¹

The recent intensified effort to increase employment of nationals in the private sector through education and training reform and the implementation of a quota scheme (Nitaqat) will have implications for the macroeconomy. Staff's empirical assessment suggests that replacing low-skilled, low-wage expatriates with nationals will increase wage levels and inflation, but if the skill composition of the national work force improves, productivity could rise and may offset any adverse impact on competitiveness. Controlling public employment size and compensation and gradually implementing the quota system will be key to avoid higher costs and disruption to private sector activity.

A. Introduction

1. Like other GCC countries, Saudi Arabia's reliance on low-wage foreign labor has been a central pillar of an oil-driven growth model that has yielded rapid economic development and substantial improvements in living standards. This model has helped overcome periods of local labor shortages and contain overheating pressures during periods of high oil prices, but it has also created distortions in the labor market, increased the reliance of nationals on public employment, and locked the economy in a low productivity growth pattern. These outcomes in turn have now become a constraint on absorbing the rapidly growing and increasingly well-educated national workforce in the private sector as job creation continues to disproportionately absorb expatriates, resulting in high unemployment rates for nationals, especially among the youth.

2. Realizing such challenges, the authorities have given new impetus to labor market reforms in recent years with the objective of increasing the employment of Saudis in the private sector. A broad reform strategy has been adopted that involves active labor policies, investment in education and training, and a wage policy aimed at raising the wage of nationals in the private sector to making private sector jobs more attractive. It also relies on enforcing a more rigorous quota system that requires companies to employ a minimum number of Saudi workers and limiting access to cheap, low-skilled expatriate workers.

3. Data shows that employment and wage structures and participation rates of women have changed since the implementation of the new initiatives. Over the longer term, meeting the government's goal of changing the structure of the labor market to one where a larger share of nationals are employed in the private sector at higher wages will have macroeconomic implications. This paper provides background on the labor market structure in Saudi Arabia, highlights the recent labor market reform initiatives undertaken by the government and assesses the early outcomes, and then looks at the potential macroeconomic impact of the reforms.

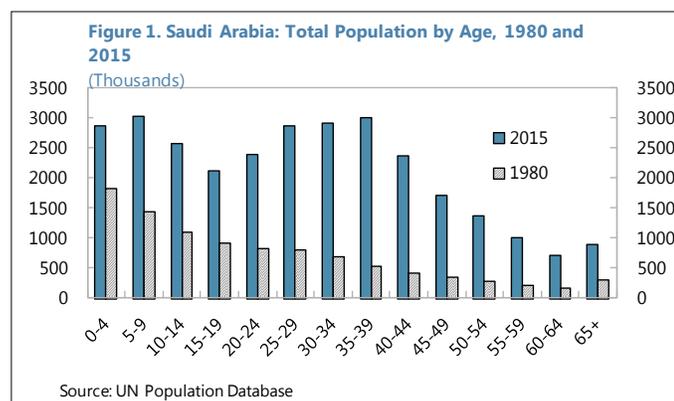
¹ Prepared by Gazi Shbaikat.

B. Background: The Employment - Growth Paradox

4. Despite rapid economic growth in recent years, the employment of nationals remains a significant challenge for Saudi Arabia given the rising proportion of youth entering the work force every year. During the 1970s oil boom, the rapid development process increased the demand for labor from the private

sector and this could not be met by local sources in terms of the number and skills of the workforce. Foreign workers were therefore used to help address the labor shortages in the private sector, while the public sector became the employer of choice for the national work force. The demographic profile and labor market structure have, however, changed drastically over the

years. Population size has tripled since 1975 as a result of natural growth of nationals and the opening of the country to inflows of expatriates. Population structure has tilted toward working age groups which are entering the labor market in rising numbers every year (Figure 1).

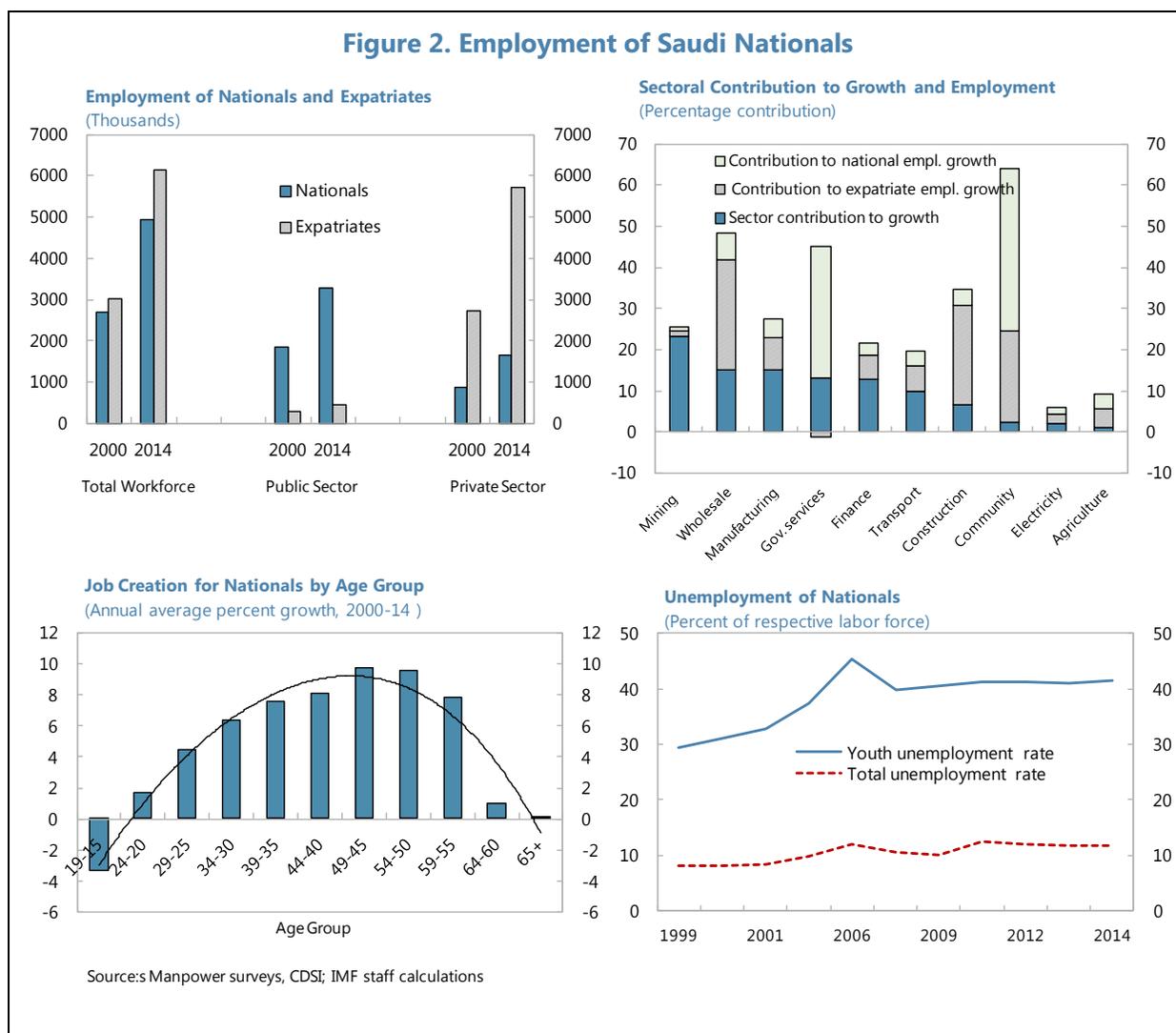


5. Private sector jobs continue to largely be filled by foreign workers, while the government remains the largest employer of nationals. Since 2000, the non-oil economy grew on average by over 7 percent a year and created more than 3.6 million jobs in the private sector, but only one fifth of these went to nationals. The employment of nationals in the public sector continued to grow despite the strong growth in private sector job creation (Figure 2, top left panel).

6. The weak responsiveness of employment of nationals to private sector growth reflects uneven sectoral contributions to growth and employment. The main growth drivers, such as the manufacturing and trade sectors, have contributed far less jobs for nationals compared to expatriates during 2000-14. Job creation for nationals has been concentrated in the government and community service sectors, which contributed more than 70 percent of total jobs created for nationals, but only 15 percent to GDP growth (Figure 2, top right panel). Moreover, job creation for nationals in the private sector has been focused on specific groups, namely males, the older and experienced, and the more educated. For young people and women, job creation has been limited (Figure 2, bottom left panel).

7. As a result, unemployment remains high among youth and women. The overall unemployment rate for nationals of 11.7 percent masks considerable gender, age, and regional variations. Among females, unemployment stood at about 33 percent in 2014, compared to less than 6 percent for males. Participation of Saudi females in the labor force is also low. Among youth, employment is high and rising (Figure 2, bottom right panel). With over 35 percent of the population still under the age of 19, this working age segment will increase rapidly, underscoring the urgency of tackling youth unemployment. Across regions, unemployment varies considerably

being as high as 20 percent in some regions. Gender gaps are much wider than at the national level in some regions. It is worth noting that at 650,000 in 2014, the total number of unemployed Saudis is only one tenth of the total number of jobs held by foreign workers.



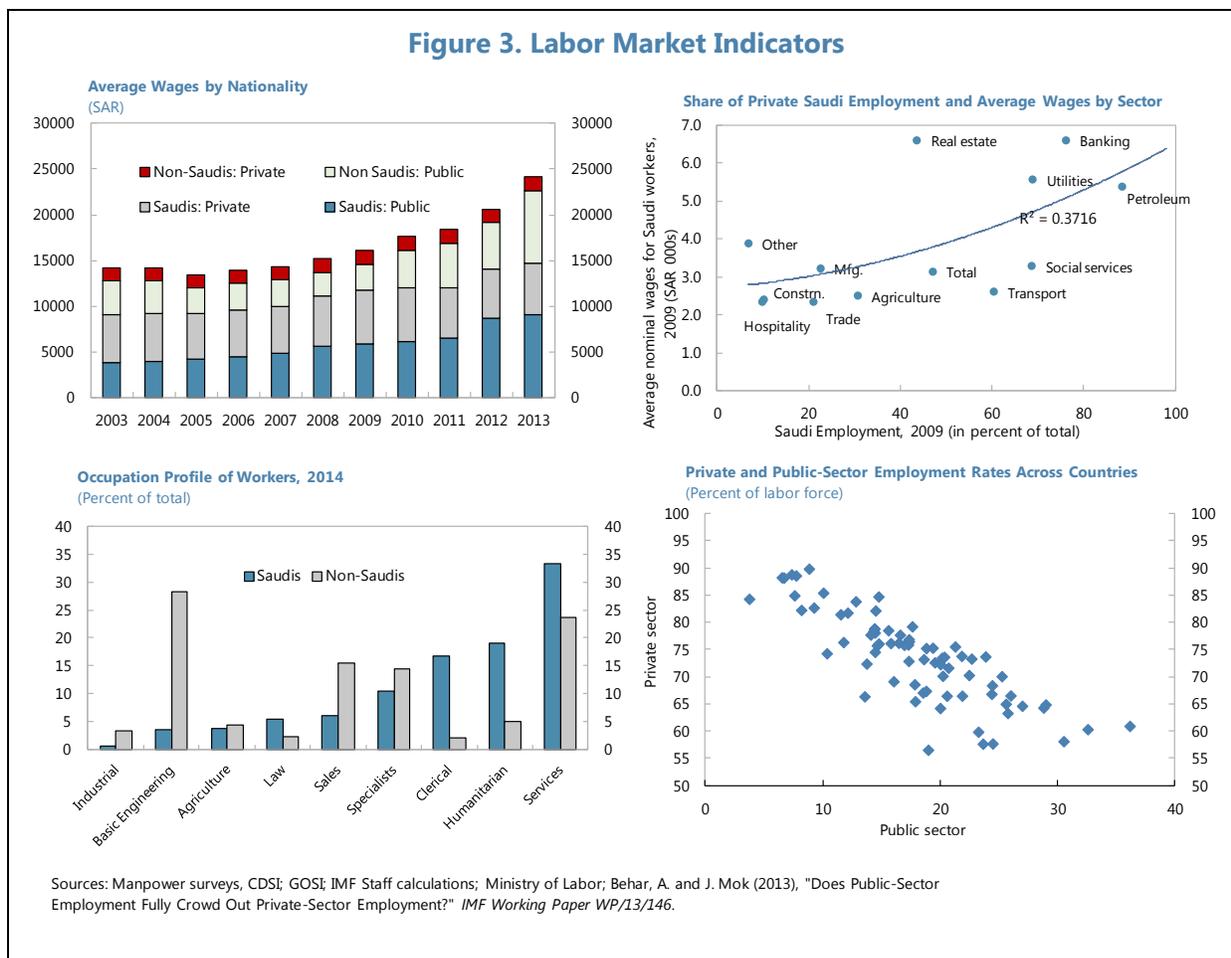
8. A number of structural factors have contributed to persistent unemployment among nationals and low substitutability between national and expatriate workers. These include differences in wage and work conditions, especially for low skilled labor, skill mismatches, and the preference of nationals for public employment. Other regulatory and cultural factors affected labor market participation especially for women.

9. Wage differentials between nationals and expatriates in the private sector and for nationals between the public and private sector have contributed to the segmentation of the labor market. These differentials create incentives for private sector employers to hire expatriates and for nationals, particularly those who are less well-educated, to seek jobs in the public sector. Historically, the wage gap in the private sector has been caused by shortages of nationals during

the 1980s and an open policy to import foreign workers from countries that have much lower income and wage levels than Saudi Arabia. Along with this, the government has implemented minimum employment shares and wages for nationals in the private sector through a number of Saudization programs implemented since the early 1990s. As a result, wage levels of nationals, are about three times those of expatriates, especially for less educated groups. In the private sector, nationals are mostly concentrated in higher-paid and higher-skilled sectors such as banking and mining (Figure 3, top panels).

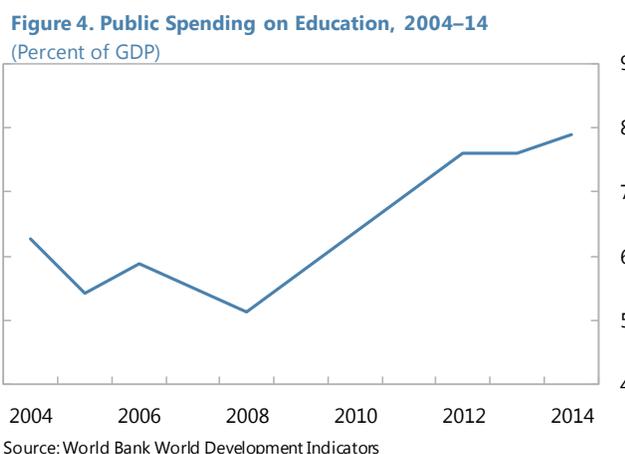
10. There also appear to be skills mismatches. This is evident in the disparities of the education and occupation profiles between employed nationals and expatriates. Whereas the largest occupational group for expatriates, about 30 percent of the total, is in “basic engineering”, for nationals their share in this category is less than 5 percent of their total employment. Their largest occupation, about 33 percent of the total, is in “services”. This occupation profile has changed little over time (Figure 3, bottom left panel).

11. In Saudi Arabia, the role of public sector employment is dominant, employing about 70 percent of the Saudi work force. Nationals, particularly the lower-skilled, appear to have a strong preference for public jobs given the higher wages they earn, and better work conditions (such as the job security, shorter work hours, and longer holidays) compared to the private sector. Public employment opportunities may also have created other distortions by creating a disincentive for nationals to invest in skills that are important for the private sector. More nationals are acquiring education and training in areas to allow them to enter the public sector, mainly in human and social specializations. Recent international evidence (Behar and Mok, 2013) shows that, on average, the creation of a public-sector job comes at the cost of a private-sector job and therefore has no impact on total employment (Figure 3, bottom right panels). This crowding-out effect can occur for three reasons: (i) reduced private sector economic activity; (ii) incentives for individuals to take public instead of private sector jobs; and (iii) skills acquisition by the labor force becoming geared toward what is needed to get a job in the public sector.



C. Recent Labor Market Reforms and Their Initial Impact

12. The authorities have made significant investment in education in recent years. Public spending on education has risen sharply reaching about 8 percent of GDP in 2014, the highest in the GCC. School attainments and technical education have improved including through partnerships with well-reputed international universities (Figure 4). The Saudi education system, however, still lags many other countries in terms of the scores students achieve on internationally standardized tests in mathematics and science (see TIMMS, 2011). Moreover, the education system does not appear at present fully geared towards private sector needs especially of technical and vocational skills.



13. New labor reform initiatives were introduced recently to increase the employment of citizens in the private sector (Box 1). The reform's main pillar is the Nitaqat program which imposes minimum shares for nationals that firms have to employ, to be able to access visa renewal and issuance for their expatriate workers, and other services provided by Ministry of Labor. While this paper does not evaluate the merits and design of the program, international experience indicates that a successful model for labor market policies is to "protect workers, not jobs" and to implement quotas gradually. In the GCC, experience indicates tradeoffs and a mixed record of success. Nitaqat seems to introduce more flexibility and targeting compared to previous programs, but as indicated by other research, it has drawbacks. For example, widening the wage gaps and basing the incentive system on facilitating expatriate employment may be at conflict with the program objective of increasing employment of nationals in the private sector (Alsheikh, 2015).

14. Data since 2011 points to mixed results so far. Employment of nationals in the private sector has increased, particularly in the manufacturing, transportation, and services sectors, and nationals have accounted for an increasing share of new jobs created. Overall, however, employment growth has declined owing to a sharp decline in expatriate employment growth (driven by the stricter enforcement of regulations on illegal foreign workers) (Figure 5, top panel). Unemployment has declined slightly and rates among youth continued to edge up. Public employment has continued to rise and the government wage bill reached about 12 percent of GDP in 2014. Other research on the impact of Nitaqat program has reached similar findings. An empirical study by Peck (2014) using firm-level data to 2012 (18 months into the program) found that under the program, 96,000 nationals had been employed in the private sector, but its overall impact on total job creation in the private sector was negative. The paper also points to some evidence that some of firms were able to avoid the system by hiring Saudi workers on a temporary basis in order to avoid penalties. Alshanbri et al. (2015) suggests, based on interviews with HR managers, that barriers to the successful implementation of the program include the skill profiles and high wage requirements of nationals, as well as cultural issues.

15. The recently introduced de facto minimum wage for nationals has led to an increase in the nationals-expatriates wage gap. The requirement for a minimum wage of SR 3,000 to be paid to earn a full Nitaqat credit has affected over 50 percent of Saudis working in the private sector.² Wage data from GOSI shows that about 700,000 Saudi workers in the lower wage category saw their wage double in 2013 (Figure 5, bottom panels).

² Employers can count a Saudi as a "full employee" only if the wage is SR 3,000. For employees earning less, they are considered only "half" a Saudi employee.

Box 1. Recent Labor Initiatives

The Ministry of Labor launched in 2011 a number of labor initiatives with a view to increasing employment opportunities for citizens in the private sector:

Nitaqat [Zones] Program: the Nitaqat program is a revamped version of the Saudization program that was in place since the 1990s. It introduces a rigorous quota system and incentives based on sector, size, and nationalization performance of private firms. Under Nitaqat, firms are color-coded and classified into categories according to the required ratio of nationals. For example, for a medium size firm in the agriculture sector, these categories are:

Color	Number of nationals/total employment
Red	0-2%
Yellow	3%-5%
Light Green	6%-12%
Dark Green	13%-19%
Dark Green	2%-26%
Grey	>=27%

Companies in the red and yellow bands are not allowed to renew work permits of expatriates, while firms that meet their targets are given rewards with preferential treatment, mainly facilitating visa renewal and issuing new visas.

De facto minimum wage: Nitaqat requires a minimum wage of SR 3,000 in order for a worker to be counted as a full credit in calculating the Saudization rate in a given firm.

Hafiz: is a jobseekers' allowance program to provide unemployed Saudis with a monthly allowance of SR 2,000 for a maximum period of one year, conditional on their participation in job search and training activities. Job placement and training services have also been expanded.

Fees imposed on companies with a majority of expatriate workers (SAR 200 per month per foreign worker) are being used to finance an expansion in the scope and duration of wage subsidies for Saudi workers in companies that are compliant with Nitaqat requirements and other labor market programs.

Improvements to the internal mobility and bargaining power of expatriate workers. Expatriate workers in firms that do not meet their Nitaqat requirements are now allowed to change employers freely, while firms that are compliant are allowed to hire more expatriate workers. This is accompanied by stricter enforcement of work permits for foreign workers.

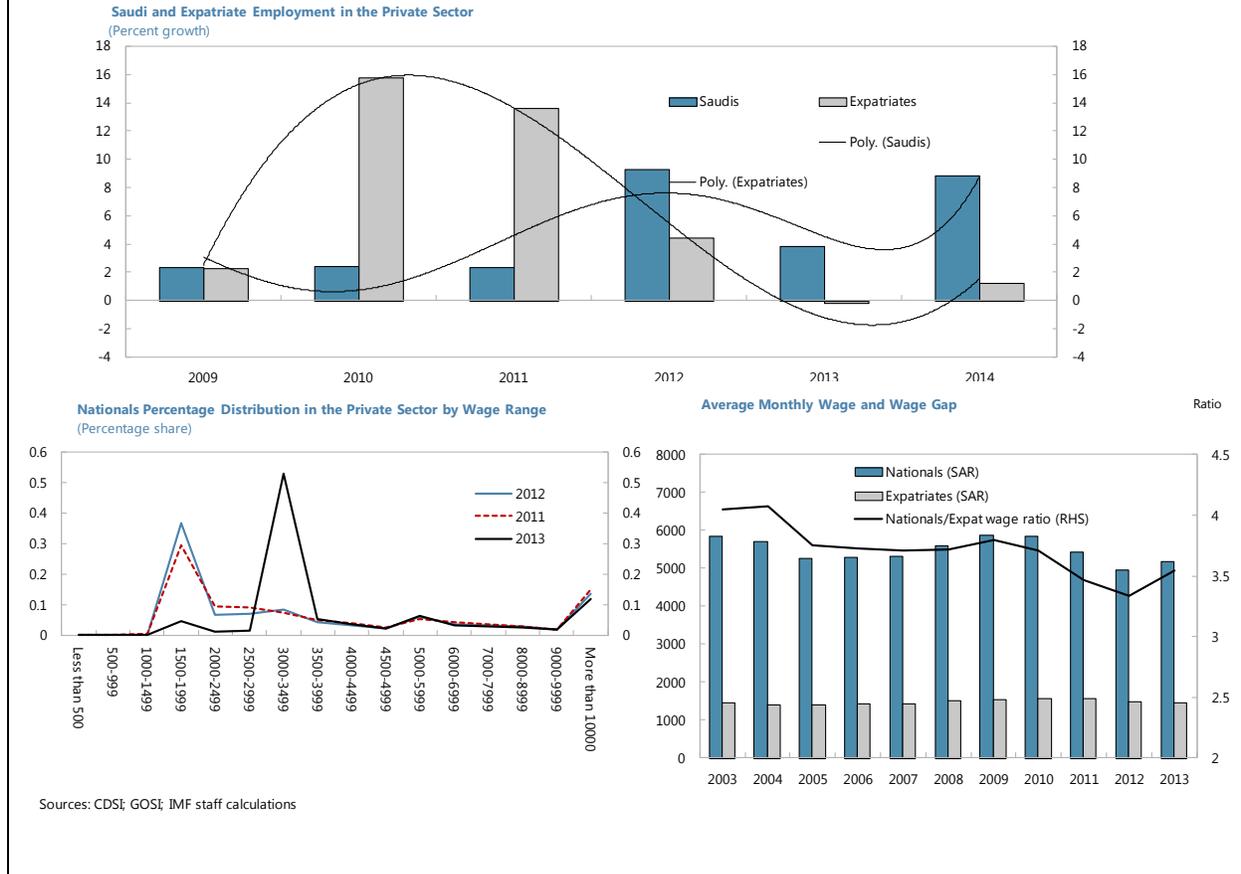
Increasing opportunities for female employment, with specific sectors (e.g. retail) being targeted.

An unemployment assistance scheme has been established to provide a broad social safety net.

D. Potential Macroeconomic Implications of Labor Reforms

16. The availability of low-wage expatriate labor has played an important role in shaping macroeconomic outcomes over the past decades. It removed constraints to private sector growth during the early stages of development, while containing wage and price pressures during upswings in the oil cycle. It has, however, created a pattern of low productivity and disincentives for nationals to build the skills needed in the private sector. Further, public sector employment has reduced incentives for nationals to seek jobs in the private sector. Recent education and labor reforms, intended to alter the structure of the labor market to one with a higher share of nationals working in the private sector, will change these patterns. The immediate impact of the new programs is coming from the Nitaqat program and other active labor policies including the Hafiz program, wage subsidies, and the new de facto minimum wage. Returns to education and skills development will likely take longer to materialize.

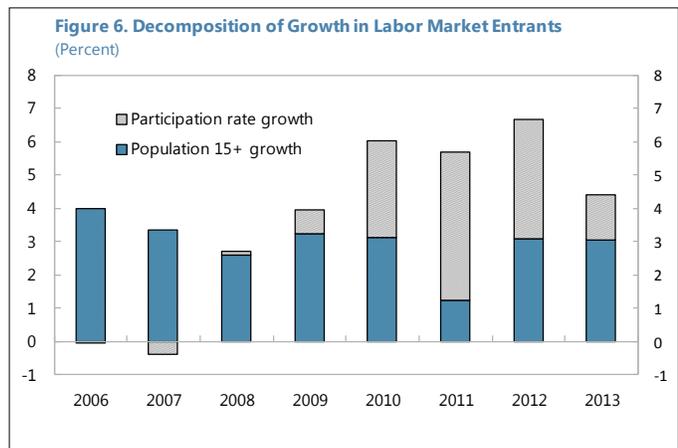
Figure 5. Labor Market Response to Recent Initiatives



E. Fiscal Implications

17. With a young and growing population and rising participation rates, especially amongst women, the need to create jobs for nationals will continue in the coming years.

Table 1 presents projections for the Saudi work force and unemployment under different scenarios for the future growth in the number of new labor force entrants. Given the current age structure and assuming a further increase in participation, between 1.6 and 1.8 million nationals will enter the labor force over the next 6 years. The higher number is derived based on the estimated growth in the working age population and a continuation of the recent increase in the participation rates, while the lower number assumes that the increase in participation rates will continue but at a slower pace as the initial impact of the initiatives introduced by the Ministry of Labor to increase female



participation slow. Figure 6 decomposes the growth in the number of new labor market entrants into the change in working-age population segment and the increase in participation rates, showing the large contribution of the latter in recent years.

18. Based on past trends, the private sector will not create enough jobs to absorb the new labor market entrants. Given the staff's projections for non-oil growth for 2015–20, past trends would suggest that the private sector would create around 1.7 million jobs and employment of nationals in the private sector would increase by between 380,000–450,000 depending on whether the share of new jobs going to nationals stays at its 2014 level of 21 percent or continues to increase in the coming years as it has done in recent years as a result of labor market reforms, to reach 23 percent in 2020.³ If we further assume that government will hire nationals at a growth rate of 3.7 percent annually as expected in the baseline, 800,000 Saudis will be absorbed into the public sector. This would then leave between 450,000–700,000 Saudis unemployed, and the unemployment rate would range from 14.9 to 16.4 percent by 2020 (Table 1, scenarios 1 and 2).

19. In the absence of reforms to increase the employment of nationals in the private sector, unemployment rates among nationals would rise or the government would have to absorb new labor market entrants into the public sector and see the wage bill increase further. The baseline projections in the previous paragraph will not only result in higher unemployment, but also result in a higher wage bill of close to 14 percent of GDP by 2020. Further, if the government aims to keep the unemployment rate constant at its 2014 level, employment growth in the public sector would need to be 5.2 percent annually during 2015–20 and this would increase the wage bill to about 15 percent of GDP by 2020 (Table 1, scenario 3).

Table 1. Employment and Wage Bill Projections 2015–20

Thousands unless otherwise specified

	2014	2020 baseline		
		Scenario 1*	Scenario 2**	Scenario 3***
Saudi labor force	5577	7180	7389	7389
Employed in public	3270	4066	4066	4420
Employed in private	1656	2040	2111	2111
Unemployed	651	1073	1212	858
Unemployment rate (percent)	11.7	14.9	16.4	11.7
Wage bill/GDP (percent)	11.9	13.6	13.6	14.7

Source: Authorities and staff calculations

* Assumes fixed share of nationals in the private sector as in 2014 at around 21 percent, and labor participation rate continues its recent improvement but at a slower pace, so number of new entrants is 1.6 million over next 6 years. Public employment growth stays at 3.7 percent. Wage rates are assumed to grow by 2 percent annually in all the scenarios.

** Assumes continued improvement in the share of nationals in the private sector to reach 23 percent by 2020 and recent trend in the growth of number of entrants to continue at same pace. Public employment growth stays at 3.7 percent annually

*** Assumes government aims to keep unemployment at 2014 level, by increasing public employment growth to 5.2 percent annually.

³ Total employment creation (for nationals and expatriates) in the private sector will be around 1.7 million. The calculation uses latest GDP growth projections for 2014–20, and assumes a fixed elasticity of employment to growth as in previous years- the average for the past 5 years is 0.84 percent.

20. Successful labor reforms that lead to an increase in employment of nationals in the private sector could reduce potential unemployment and the fiscal burden.

Using the projections in the previous paragraphs, if, for example, labor market reforms were to increase the share of nationals employed in the

private sector by 10 percentage points from its current level to 32 percent by 2020, this would result in 1.2 million jobs going to nationals out of the 1.7 million projected to be created in the private sector by 2020. Under this scenario, unemployment would decline to 5.1 percent, assuming the government continues to hire nationals at same rate as in the baseline scenario (Table 2, scenario 4). Reforms could alternatively allow the government to

reduce the growth of hiring in the public sector to less than 2 percent annually and this would keep both the wage bill and unemployment rate around their 2014 levels (Table 2, scenario 5 and Figure 7). A larger increase in national employment in the private sector would result in lower unemployment and/or a lower public sector wage bill.

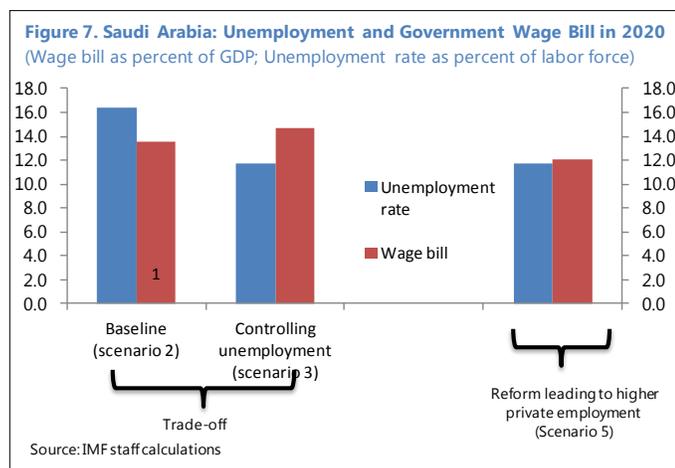


Table 2. Employment and Wage Bill Projections 2015–20

Thousands unless otherwise specified

	2014	2020 under reforms	
		Scenario 4*	Scenario 5**
Saudi labor force	5577	7389	7389
Employed in public	3270	4066	3576
Employed in private	1656	2947	2947
Unemployed	651	375	866
Unemployment rate (percent)	11.7	5.1	11.7
Wage bill/GDP (percent)	11.9	13.6	12.1

Source: Authorities and staff calculations

* Reforms lead to higher share of nationals in the private sector by 10 pp. Assumes no change in growth of public employment of 3.7 percent annually. Calculations of wage bill assumes growth of 2 percent in wage rates.

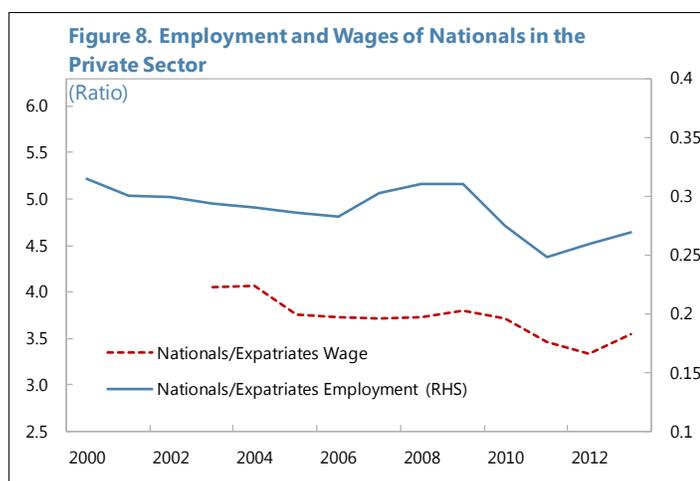
** Reforms lead to higher share of nationals in the private sector by 10 pp. Assumes government reduces growth of public employment from 3.7 to less than 2 percent annually.

F. Impact on Wages, Inflation and Real Exchange Rate

21. Expatriates have helped dampen the inflationary impact of higher growth during oil cycles and helped limit real exchange rate appreciation. Inflation has been low in Saudi Arabia despite strong growth, and has remained below that of trading partners. This has limited the appreciation of the real effective exchange rate. While a number of policies have contributed to this trend, including the credibility of the exchange rate peg, the almost fully elastic supply of foreign labor has limited wage pressures, and remittance outflows have reduced domestic demand for nontradable goods and services.

22. The first channel of impact on prices will be through wages which will increase in response to policies aiming at increasing the attractiveness of private sector jobs for nationals.

Employment of nationals in the private sector is correlated to their wage level, which means that average wages will have to increase to attract more nationals (Figure 8). The impact on total costs could be large in some sectors, depending on the share of workers' compensation in operating costs, which ranges from less than 10 percent to over 75 percent in some service sectors. Under a scenario where labor market reforms increase the share of nationals in the labor force by 10 percentage points (from 22.4 percent to 32.4 percent), and

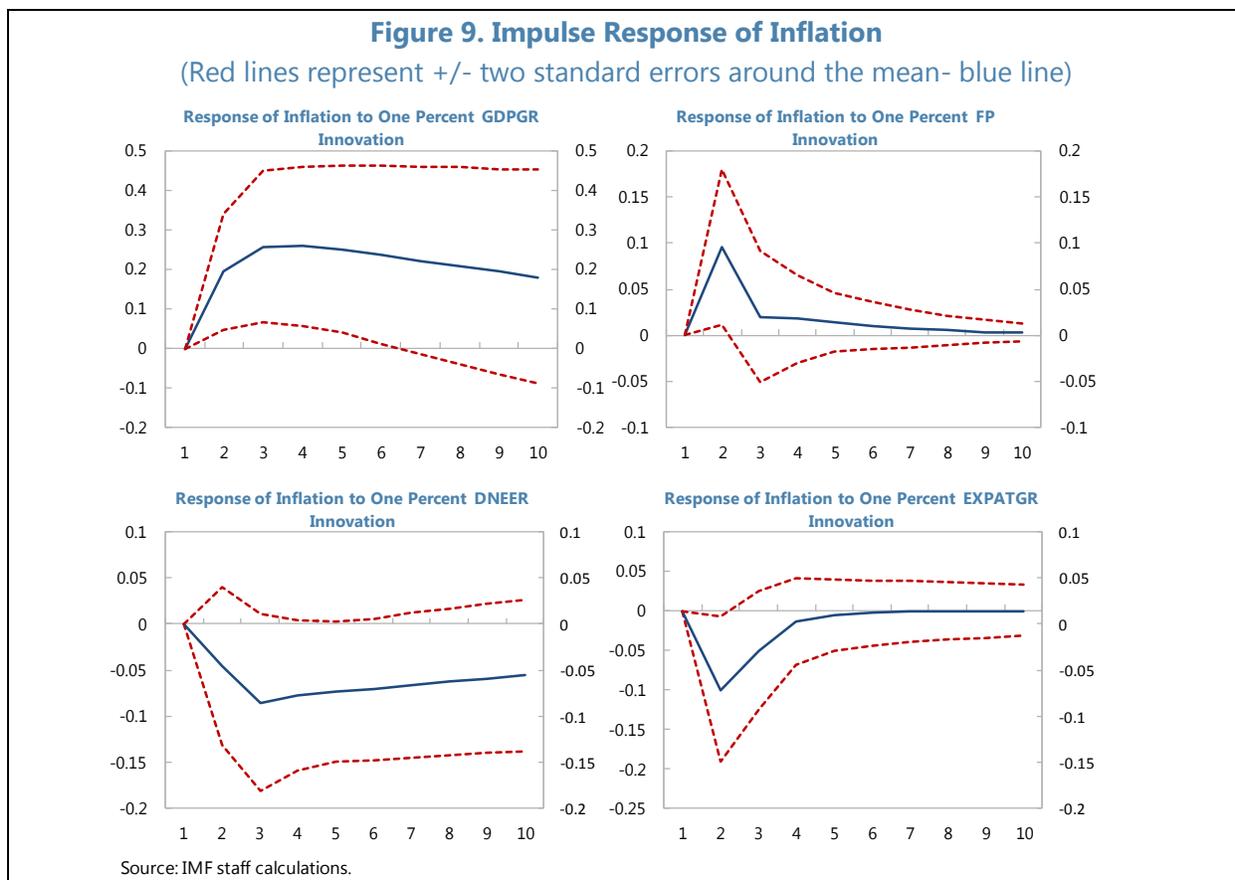


using current wage gaps, operating costs in the private sector could rise by up to 3 percent. The cost-push impact on inflation will depend on size of operating costs in total production costs and on the pass through of these costs to final prices.

23. Staff estimates find that changes in the size of the expatriate workforce have an impact on inflation along with food prices.

A higher share of nationals in the workforce compared to expatriates will likely reduce the restraining effect that the ready availability of expatriate labor has on inflation. To estimate the possible impact on inflation, a VAR relating CPI inflation to food price inflation (FP), non-oil GDP growth (GDPGR), the change in the effective nominal exchange rate (DNEER), and growth of expatriates in the workforce (EXPATGR) was estimated using annual data from 1980-2014. The results suggest that a one percent increase in the growth of expatriates in the workforce reduces inflation by about 0.1 percent after one year and this effect fades over time (Figure 9, bottom right panel). This impact from expatriate labor on inflation is consistent with other findings for the GCC (IMF, 2014) and Espinoza et al. (2013)

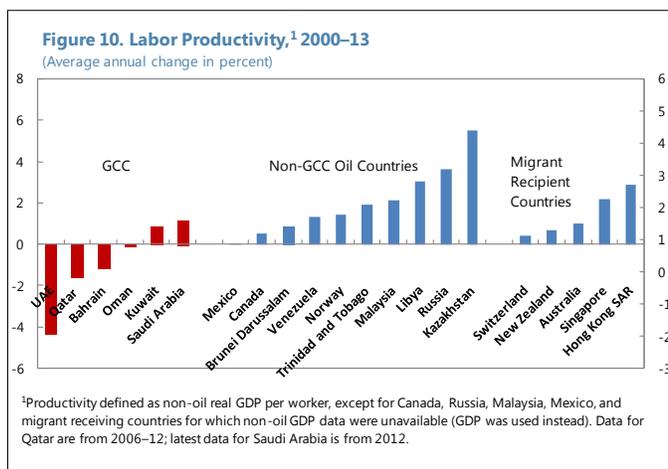
24. Gradualism in implementation of labor market policies will help ease the inflationary impact. The impulse response functions from the VAR can be used to estimate the potential impact of a lower share of expatriates in the labor force as a result of labor reforms. A gradual decline in expatriate employment growth annually over 2015–20, from the recent average of 3.5 percent annually to 1.5 percent will increase the ratio of nationals in the private sector by 10 percentage points. The impact on inflation will be small each year, around 0.2-0.4 percent. By averaging over the cycles, these estimates, however, may mask the role the ready availability of expatriate labor plays in containing inflation at times of strong demand pressures in the economy.



25. Replacement of expatriates could also lead to real exchange rate appreciation. The impact works through changing the proportion of domestically spent income out of total income generated in the country and the size of remittances, which are leakages that reduce aggregate demand and pressures on domestic prices. This impact is consistent with findings of econometric work on other oil-exporting, labor-importing countries. Prasad et al. (2013) link the real exchange to its determinants including the size of remittance outflows and find that the latter leads to depreciation of the real effective exchange rate in this group of countries.

G. Productivity and growth

26. Growth in Saudi Arabia has been strong in recent years, but productivity growth has generally been slow. High population growth and the chosen growth model, whereby strong growth has been underpinned by the availability of relatively low skilled, low-cost foreign labor, has contributed to this pattern. The growth in the non-oil sector has been mainly driven by factor inputs, capital investment and



labor, while total factor productivity (TFP)—a measure of how efficiently capital and labor inputs are being used in the production process—has generally made a small contribution. Saudi Arabia, however, compares favorably to other GCC and some oil exporting countries, and productivity growth has improved in recent years as a result of increased investment in education and infrastructure (Figure 10). Nevertheless, labor productivity growth still lags behind other oil exporting countries (IMF, 2014).

27. Ongoing reforms will affect productivity and growth. To assess the potential impact, this section empirically estimates the role of factor inputs and total factor productivity via a growth accounting approach based on the Cobb-Douglas production function, Solow (1957). Starting with the following presentation of the function:

$$\Delta \ln(Y_t) = \Delta \ln(A_t) + \alpha \Delta \ln(K_t) + (1 - \alpha) \Delta \ln(L_t), \quad (1)$$

where $\Delta \ln(Y_t)$ is output growth in period t , $\Delta \ln(k_t)$ is the capital accumulation rate in period t , $\Delta \ln(L_t)$ is employment growth in period t , and $\Delta \ln(A_t)$ is TFP growth. The cost share of capital, α is assumed to equal 0.4, a value that is commonly used in empirical work. The initial capital stock is estimated using perpetual inventory method (Harberger, 1978). The contributions of capital, labor, and TFP to non-oil sector growth for the period 1990 onwards and for two sub-periods, 1990–99 and 2000–14, are estimated and presented in Table 3, top section.

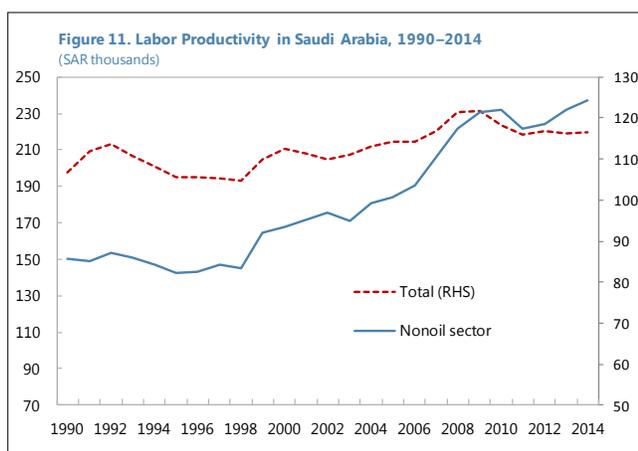
Table 3. Average Contribution to Non-Oil Sector Growth (Percent)

Cost Share of Capital (α) = 0.4		
	1990-99	2000-2014
Growth	2.9	6.8
TFP	-0.4	1.0
Capital	2.0	3.0
Labor	1.3	2.8
Cost Share of Capital (α) = 0.68		
	1990-99	2000-2014
Growth	2.9	6.8
TFP	-1.2	0.3
Capital	3.4	5.0
Labor	0.7	1.5

Source: IMF staff calculations.

28. TFP growth has improved and became positive in the 2000s, compared to the 1990s. The contribution of TFP remains small, however, compared to labor and capital factors. An alternative specification, where the cost share of capital is estimated directly from the data was also looked at. Using this methodology, the results are qualitatively the same, although TFP growth is estimated to have been smaller in both periods, while capital growth contribution has increased, (Table 3, bottom section).

29. Labor productivity, measured by unit labor real output, in the non-oil sector has picked-up in the 2000s, but remained flat for the economy as whole (Figure 11). A number of factors may have contributed to productivity enhancement in the non-oil sector including increased investment in infrastructure, investment in



education, accession to the WTO and liberalization reforms in the 2000s.

30. Investment in education and skills could further improve productivity. Saudi Arabia has invested heavily in education in recent years and made impressive progress in expected years of schooling which increased from 5.8 to 8.7 between 1990 and 2013, although measured educational outcomes are less favorable. To estimate the role of education, we use an augmented Solow growth model with human capital, (Mankiw, 1994). The production function that includes human capital can be written:

$$Y=A*K^{\alpha}*(LH)^{(1-\alpha)} \quad (2)$$

Where H is human capital, measured by average years of schooling as a proxy for skills. By dividing equation (2) by L, labor productivity growth (y_t) can be presented as a function of physical capitalization as measured by the change in the capital-labor ratio (k_t) and human capital as measured by improvement in years of schooling:

$$\Delta \ln(y_t) = \Delta \ln(A_t) + \alpha \Delta \ln(k_t) + (1-\alpha) \Delta \ln(H_t) \quad (3)$$

Table 4 presents the contributions to the growth using cost share of capital, $\alpha = 0.4$. Results show that education has contributed positively to labor productivity and played a more important role than physical capitalization. The contribution of TFP in productivity growth is also small but has improved in recent years. When parameters are derived from a regression, the value of α is estimated at 0.64 and the contributions change, although they keep same pattern of improvement in recent years. Specifically, capital/labor ratio seems to play a larger role in explaining improvement in labor productivity, while education contributes less. The role of TFP improves but remains negative in the second period.

Table 4. Contribution to Labor Productivity (percent)		
Cost Share of Capital (α) = 0.4		
	1990-99	2000-2014
Productivity Growth	0.9	2.1
TFP	-1.4	0.1
Capital labor ratio	1.1	1.0
Human capital	1.2	1.0
Cost Share of Capital (α) = 0.64		
	1990-99	2000-2014
Productivity Growth	0.9	2.1
TFP	-1.6	-0.2
Capital labor ratio	1.8	1.7
Human capital	0.7	0.6

Source: IMF staff calculations.

31. The results suggest that improvements in education and skills of nationals should help strengthen productivity performance over time. As improvement in quantity of education as measured by years of schooling is reaching its limits, the recent increased investment in education should continue to be focused on improving the outcomes of the education and skills development and aligning them with private sector needs and on directing more share of this investment to technical and vocational training.

H. Policy Recommendations and Conclusions

32. Firm control of public employment and compensation is needed to encourage people to seek employment in the private sector. A clear sign from the government that the public sector can no longer be the employer of first and last resort would help set expectations of people entering the workforce. This could be combined with a civil service review to help identify positions that are essential for the provision of government services and those that are not.

33. Gradualism in substituting foreign workers would help limit any potential disruptions to economic activity and pressures on wages and prices. Currently, the skill profiles of nationals are not in line with private sector needs, especially for basic technicians and basic supporting engineering skills, and private sector needs will continue to rely on expatriates in the near term. Building skills is a slow process and will require continuous efforts to transform the education and training systems to be demand driven, and encourage more Saudis to pursue vocational and technical programs. These factors should be taken into account in the design and enforcement pace of the Nitaqat quotas. Other research suggests a need for gradualism in the implementation of employment quotas to preserve the incentives for qualified candidates to invest in skills (Fryer and Loury, 2005).

34. Wage gaps will need to narrow to increase the employment of nationals in the private sector, but this will need to go in tandem with changes in productivity and skill composition. Narrowing wage differentials can be achieved by targeting high-skilled, high-wage expatriate workers through fees on low skilled labor, leveling the playing field in the labor market for nationals and expatriates with regard to regulations and work conditions, and allowing more labor mobility to increase productivity and wages of expatriates. Naidu et al. (2014) find evidence on the latter in the UAE where reforms to increase expatriates mobility have increased their earnings and reduced demand to import new immigrants. The wage subsidy programs implemented by the government can be useful not only to support the acquisition of job skills, but also to narrow the wage differentials. For more details on ways to reduce wage differentials in the GCC and international experience, see IMF (2014).

35. Macroeconomic policies will need to adapt to a labor market where overtime the role of foreign labor may diminish. If the labor market becomes less flexible and less able to play its historic role of helping contain overheating pressures, alternative instruments will be needed. Under the current exchange rate peg, the main instrument will be fiscal policy. Smoothing expenditures and building buffers during oil price booms would reduce overheating pressures and keep inflation under control. Reforms to strengthen the fiscal framework and adopting a medium term framework would support policy and delink expenditure from oil revenue swings. Reducing rigidities in the budget through lower wage and subsidy bills would facilitate the work of fiscal policy and free resources for more productive spending. Over the longer term, greater exchange rate flexibility that would allow a more independent monetary policy could help manage economic cycles and cushion the economy from external shocks.

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